COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper
Second-class postage paid at Boston, Mass., and additional mailing offices

Price: $9/year
May 23, 1973
Vol. VII, No. 21

NEWSPAPER

CW Photos by Ronald A. Frank

AT&T's Dataspeed 40 display terminal is demonstrated by Cheryl Kaye who holds up hard copy of data on the screen.

Products on Parade At ICA Conference

By Ronald A. Frank
Of the CW Staff

BOSTON – AT&T chose the annual conference of the International Communications Association (ICA) last week to introduce its Dataspeed 40 CRT terminal.

The Bell display unit was one of the equipment announcements by several suppliers at the communications users' show.

Paul Sternberger, system research manager with Dow Jones, checks out Western Union Data Services' Model 33 MSR tape cassette terminal with Brad O'Brien.

Among the products shown, GTE led the parade with a programmable display, key-entry system and a communications management system. Western Union Data Services Co. added a magnetic cassette buffer to the Teletype Model 33, while Interdata showed a store-and-forward message-switching configuration of its Model 50 CPU.

The ICA conference also included presentations by the major common carriers about existing and planned services as well as seminars and technical sessions dealing with interconnection, proper operating procedures for communications managers and regulatory discussions.

Characterized as an evolutionary extension of previous equipment supplied by Bell's Teletype Corp., the Model 40 is a modular partial LSI system with keyboard display/printer (KDP); keyboard display (KD); and receive-only printer configurations.

(Continued on Page 2)

256K-Byte 360/30 Under OS Increases Multi-Job Capability

By Michael Weinstein
Of the CW Staff

MILWAUKEE – There are presently around 5,000 users in the U.S. operating IBM 360/30 systems under DOS. Sometime this month, these users will be joined by at least one 360/30 user operating under OS Version MFT II with four times the memory of the largest standard IBM-supplied system 360/30 yet paying about 30% less rent.

The entire system is being installed by Commerce Group Corp. (CGC) here and consists of the central processor, 256K bytes of core memory, maintenance and software support, according to a company spokesman.

"An historical view held by many users is that OS will not run efficiently on a small machine as it requires much more overhead than DOS," the spokesman said.

"While it is true that our 360/30 running under OS has more overhead, the inclusion within the system of 256K bytes of memory enables the user to enjoy all the benefits of OS including improved handling of direct access space and improved utilization of main storage," the spokesman indicated.

15 Jobs Simultaneously

But possibly the major advantage to users running under OS is that it allows up to 15 jobs to be run simultaneously, he added. Under DOS, users are limited to three partitions and thus can run only three jobs at any one time.

The firm does not envision users running the maximum of 15 simultaneous jobs, but can see definite benefits from running five or six.

"Because of the inherent superiority of OS, the multi-job capability will not degrade as the user adds more job streams, and so for a six job-stream operation the Model 30 user can realize greater capabilities," he added.

The firm was hesitant to discuss actual benchmarks on the system being installed but said complete statistics should be available to interested users in June.

The spokesman did say a preliminary set of evaluations indicated the "super-30" would easily compete against the smaller end of the 370 line, even though the 370 machines have a markedly faster internal speed.

Sole Source Vendor

In offering the new system, Commerce Group is buying all the needed ingredients and will become a sole source vendor.

(Continued on Page 2)

Cary Admits IBM Hired Some Competitor Engineers

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. – IBM moved to press its counterclaim in the Telex antitrust suit here last week, but Telex lawyers managed to turn the tables on IBM when IBM Chairman and President Frank T. Cary was called to testify.

In the counterclaim, IBM charges that Telex hired IBM employees in order to gain access to confidential IBM information. But under questioning by Telex attorneys, Cary admitted that IBM itself had hired engineers from competitors, particularly in the semiconductor area, and he hinted it had done so to catch up with developments in its competitors' laboratories.

Cary admitted IBM was lagging behind such organizations as Bell Laboratories and Texas Instruments in the development of field effect transistors for computer systems, and that during that time (late 1960s) IBM had hired engineers from those organizations.

Floyd Walker, the lead Telex attorney, introduced into evidence a document that he said was a "scorecard" kept by IBM on its hiring program of key engineers from these other companies.

Earlier in the counterclaim activity, IBM called Richard Wilmer, an engineer with the firm's San Jose Plant, to testify he had been offered a 25% salary increase as well as a $100,000 bonus by Telex to work for Telex to develop a 3330-type disk drive.

What hardware, software are on IBM's drawing board? Page 4. Frank Cary talks about IBM's bad year. Page 3. Telex claims IBM's practices cost Telex $361 million in the marketplace. Page 25.

The bonus, he said, would have resulted if he was able to develop the 3330-type system within 18 months after coming to Telex and he would have gotten another $1,000 bonus if he was able to build and have installed 50 or more of the units within one year after the completion of development.

He said he told the Telex ex-

(Continued on Page 3)

Controllers in 6025 CPU

Low End of H6000 Grows

By Michael Weinstein
Of the CW Staff

WALTHAM, Mass. – Honeywell has added a new computer to the low end of its Series 6000.

The Model 6025 is designed for present H400 and large H200 users who want to upgrade to multi-job streams, time-sharing and network processing.

Competitively, the 6025 is designed as an alternative to IBM's 370/135 and 370/145, Burroughs' B-4700 and Univac's 9700 and 1106, a firm spokesman said.

To make the move to a 6025 more appealing, Honeywell is providing several transmission programs including Cobol-to-Cobol file-to-file translations and assembly language-to-Cobol conversions covering IBM 360, Univac Series 70, Honeywell 200, 2000 and 400 computers.

For those users moving up within the Honeywell line, peripheral interfaces are common between the 400 and newer 6025.

System architecture of the 6025 features a 1.2 μsec semiconductor main memory in configurations of 320K, 384K and 512K bytes.

Following the lead of IBM, the controllers have been integrated into the mainframe. The Inte-

(Continued on Page 2)

Watergate Spawned Fear of '72 Vote-Count Fraud

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. – With the tales of Watergate and other Republican political sabotage tactics rampant during the late stages of last year's Presidential campaign, officials in the McGovern for President situation room here became increasingly concerned that there would actually be tampering with the vote-counting process itself, especially in computerized vote systems.

"At first it was just a matter of academic concern, but when the reports started trickling in of the possible extent of sabotage to the election process, we really became worried," one of the planners remembers.

"We were especially worried about the large computerized counties," since a change in the count by a small amount there could have a large effect on the outcome of the campaign, according to Eli Segal, an official with the campaign at that time.

Because of this fear, the campaign set up a special section to deal with possible computer frauds in the vote-counting process and to hire an outside consultant to give seminars in several states on what to look for in possible vote tampering, he said.

Segal said, however, that the effort was "too late and too short of money" to really be

(Continued on Page 5)

On the Inside

Soviet Discusses Progress Of Cybernetic Medicine – Page 6

Demand for Beginning Programmers Should Grow – Page 24

Communications 15
Computer Industry 25
Editorial 8
Education 24
Financial 34
Small Systems User 20
Societies 23
Software/Services 13
Systems/Peripherals 21

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

V.J. FARMER, *managing editor.* **RONALD A. FRANK,** *technical news editor.* **EDWARD BRIDE,** *general news editor.* **E. DRAKE LUNDELL JR.,** *computer industry editor.* **MARVIN ARONSON,** *assistant managing editor.* **DONALD LEAVITT,** *software editor.* **MICHAEL WEINSTEIN,** *systems editor.* **MARY UPTON,** *financial editor* and *assistant computer industry editor.* **LESLIE FLANAGAN, JUDITH KRAMER,** *copy editors.* **KEN SHONK, TONI WISEMAN, MARGUERITE Y. ZIENTARA,** *staff writers.* **PATRICK G. WARD,** *editorial assistant.*

ALAN TAYLOR, J. DANIEL COUGER, DAVID E. FERGUSON, FRANK GREENWOOD, *columnists.*

E. DRAKE LUNDELL JR., *Washington bureau.* **MARVIN SMALHEISER,** *West Coast bureau.* **J.H. BONNETT,** *European bureau.*

NEAL WILDER, *vice president – marketing.* **DOROTHY TRAVIS,** *marketing administrator.* **JUDY MILFORD,** *advertising coordinator.* **ELLEN FUSFELD,** *market research.*

LEETE DOTY, *production manager.* **HENRY FLING,** *production supervisor.*

W. WALTER BOYD, *publication manager.* **PATRICK J. McGOVERN,** *publisher.*

EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160. Phone: (617) 332-5606. Telex: 92-2529. **Washington:** Room 1129, National Press Bldg., Washington, D.C. 20004. Phone: (202) 638-0901. Telex: 89-544. **Los Angeles:** 963 N. Edgecliffe Drive, Los Angeles, Calif. 90026. Phone: (213) 665-6008. **Europe:** Computerworld, c/o IDC Europa Ltd., 59 Grays Inn Rd., London, W.C.1, England. Phone: 01-242-8908. **Japan:** Computerworld, c/o Shukan Computer, Dempa Building, 1-11-15, Higashi Gotanda, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. © 1973 by Computerworld, Inc.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to publication manager.

25 cents a copy; $9 a year in the U.S.; $10 a year in Canada; all other foreign, $25 a year. **MARGARET PHELAN,** *circulation manager.* Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160. v

COMPUTERWORLD, INC.
Patrick J. McGovern .... *president*
W. Walter Boyd ...... *executive vice president*
Robert M. Patterson .. *vice president–editorial*
T. Neal Wilder ...... *vice president–marketing*

BPA ABP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

Join the growing number of Computerworld subscribers.

Use the coupon below.

Products on Parade at ICA Show

(Continued from Page 1)

The Model 40 will operate at 1,200- or 1,050 bit/sec in Ascii code. It includes a display buffer memory with a capacity of 72 lines of 80 characters each. In addition to scroll and blink features, the CRT has a cursor to allow the operator to see a "reverse image" (black character on white cursor background) of the character in the buffer.

The terminal has a Home key that can be triggered remotely to allow unattended retransmission of data. First deliveries are scheduled for August of this year with three-month delivery cycles projected for 1974, AT&T said.

The Dataspeed 40 will later include a cluster capability to allow multiple displays to share a line. In addition, a wide platen printer, larger memory size and a tape cassette compatibility are under consideration. The initial model will be compatible with the Bell 4210 magnetic cartridge unit now available with teletypewriters.

The Model 40 will not be available from Bell for customer-provided data sets, according to an AT&T official.

This decision was based on similar configurations involving teletypewriters where the telephone company must have control from the terminal out to the line in order to properly maintain the system, the official added.

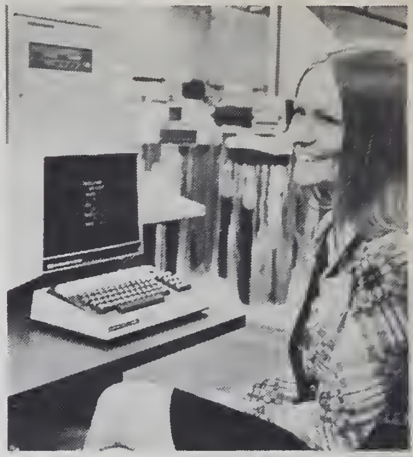
But an OEM version will be supplied by Teletype Corp. at a later date and will be interconnected with non-Bell data sets.

Built-In Diagnostics

To facilitate maintenance, the Model 40 contains extensive built-in diagnostics to allow internal functions to be displayed on the screen by Bell field personnel. Among the type of functions that can be monitored on the screen are vertical and horizontal alignment, character generation and test messages for line problems.

The KDP will cost about $175 to $195/mo; the KD version will be priced at $110 to $125/mo; and the RO model will cost $105 to $120/mo. Bell has not yet filed a tariff for the CRT but the first interstate application is expected later this year.

Sometime in 1974 a synchronous model will be added to the initial Ascii version. When the cluster capability is introduced, a controller/multiplexer unit will be part of the configuration, an AT&T source said.



CW Photo by Ronald A. Frank

Penny D'Antonio, GTE systems programmer, developed the software for the Generalized Communications System introduced at the show.

Among the other products introduced to the more than 400 users at the conference was a cassette version of the Model 33 TTY from Western Union Data Services Co.

The Model 33MSR single-cassette unit can be used in conjunction with the teletypewriter's paper tape to duplicate the capabilities of dual-cassette terminals, according to the Data Services Co.

For this type of application, the paper tape can be used as the "format buffer" with the cassette serving as the storage buffer. The 33MSR can transmit at 1,200 bit/sec and can retransmit data under remote CPU control for polling applications.

The KSR model will cost $116/mo while the ASR unit will cost $129/mo. One-year lease rates for the same units are priced at $108 and $121, the company said. First deliveries are scheduled for August.

GTE Display

GTE Information Systems included a programmable CRT system and a Generalized Communications System data management system as part of its line of equipment introduced at the show.

The 7800 is plug-compatible with IBM 360/370 programmable CRT systems, and the binary synchronous system can be used in both cluster and stand-alone configurations. Prices for the stand-alone model start at $130/mo.

The data management system combines hardware and software to give the user a complete communications/file management system.

The system features the Tempo II processor (now called the IS 1000) with up to 64K words of storage. A typical configuration including six Videomaster displays, processor with 24K words, 22M bytes of Ampex disk storage and necessary software will cost about $110,000, a spokesman estimated.

Honeywell Adds to Series 6000

(Continued from Page 1)

grated Control Unit contains disk and unit record control functions in addition to the system controller and the Input/Output Multiplexer. Magnetic tape controls are external to the central processor.

A major feature of the 6000 Series is the ability to run in a multiprogramming mode. The General Comprehensive Operating Supervisor (GCOS) common to the 6000 Series allows users to run concurrent multidimensional processing – local and remote batch, transaction processing, message-switching, time-sharing, direct program access, interactive remote job entry and on-line document entry – all from a common data base.

Some of these functions (remote batch, transaction processing, time-sharing, message-switching and direct program access) are performed by software resident in the Front-End Network Processor (e.g. Datanet 355).

Two software systems – GRTS and NPS are available for this purpose.

Module Coordinates

Coordination of all I/O operations between peripherals and the central processor is supervised by an input/output multiplexer (IOM) module. Data is transferred at about 1 Mbyte/sec.

The 6025 operates with standard 6000 Series peripherals and can be connected with either the Datanet 305 or Datanet 355 communications processors.

A minimum 6025 system configuration might consist of a central processor with 80K words of memory, console, printer, card reader, three tape drives and two DSU190 disk drives (200 Mbytes on-line storage) and would rent for $18,000/mo on a three-year lease.

A typical system configuration with communications capabilities would rent for about $21,000/mo on a three-year lease with a large system renting for about $29,000/mo.

360/30 Under OS Stores 256K Bytes

(Continued from Page 1)

"We are not suggesting to users that they get the central processor from one source, the memory from another and the software and support from us. We intend to provide everything in one package," Burton said.

The OS Model 30 (central processor and 256K-byte memory), will be offered to users on a three-year leasing arrangement for about $3,500/mo with maintenance extra.

A more typical system including three 2314-type disk subsystems, four tape drives, printer and card equipment will lease for about $7,600/mo from 6001 N. 91st St., 53225.

A 360/30 with 64K bytes of memory and the same peripherals from IBM would lease for about $11,000/mo.

ATTACH LABEL HERE for address change or inquiry. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels. Please let us know four weeks before you plan to move. List new address below and include a current mailing label or your old address.

CHECK HERE TO ENTER YOUR SUBSCRIPTION

☐ 1 year – $9*

*$10 a year in Canada; all other Foreign, $25 a year.

☐ Charge My American Express Account:

If charge we must have cardholder's signature:

☐ New subscription
☐ Change of address

First Initial
Middle Initial
Surname
Your Title
May 23, 1973
Company Name
Send to: Address
City
State
Zip Code

Address shown is: ☐ Business ☐ Home ☐ Check here if you do not want to receive promotional mail from *Computerworld.*

COMPUTERWORLD Circulation Department
797 Washington St., Newton, Mass. 02160

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

YOUR INDUSTRY
01 Mining/Construction/Oil & Refin.
02 Manufacturing – Computer or data system hardware/peripherals/other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm Sys/Transport
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureaus/Software/Plann.
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Govt.
12 Communications/Printing/Publ.
13 Other:

YOUR FUNCTION
01 Corporate Officer
02 Data Processing & other Operational Mgmt
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering-Management/Scientific/R&D
07 Sales/Marketing/Account Exec.
08 Librarian/Educator/Student
09 Other:

Cary Cites 'Very Bad' Year

Plug-Compatible Peripheral Competition Stiff in '70

TULSA, Okla. – The trend of IBM was "very bad" in 1970, Frank Cary, IBM president, told the court here last week in the $1.2 billion antitrust suit by Telex.

Because of that, he said, IBM had decided to compete against the plug-compatible peripherals makers instead of losing any more business to them.

Because of the competition, Cary claimed IBM had to cut prices on tape and disk equipment or get out of that business.

Unrelated Decisions?

But at the same time he denied allegations that IBM had increased the prices on CPUs in order to make up for the revenue lost by the fixed-term plan and other price-cutting actions in the peripherals area. The two decisions were unrelated, he said.

Cary said IBM had the worst sales record in its history in 1971, even though he claimed the firm's revenues were up slightly that year.

Cary admitted it cost IBM only $8,690 to manufacture a dynamic address translation box and that the unit was built into the 370/158 at an increase in price of only $5,000, but it was being sold to purchase equipment customers for $200,000.

When Judge A. Sherman Christensen questioned why the Telex attorneys were pursuing this line of questioning, they replied the DAT box pricing was another example of IBM monopolistic pricing since it was sold at a 200% profit to owners of IBM machines.

Christensen said, however, the subject was "too peripheral, if I may," to the main part of the case and the subject was dropped.

Cary noted the recession of 1970 had caused major problems for IBM because users were canceling their 30-day leases with IBM. He said the firm had taken major action to overcome the problems including a freeze on hiring, but they had remained at the end of 1971.

IBM's competitors in the systems market, he admitted, had done better than IBM during the 1970 period, even though he did not know exactly what their business plans had been for that time.

He denied that the fixed-term plan price decreases had been made solely to boost the morale in the field so that there would not be a bad marketing reaction when the price increases on CPUs were announced later in the year.

He testified that after the 360 announcement IBM had decided in the future not to announce all systems in a computer family at the same time but to announce the different parts of the systems as they were ready.

Market Definition

Earlier in the case IBM had called economist Frank Fisher of MIT to testify on the issue of how to define the relevant market in such a case.

Basically, Fisher said, the market definition used by Telex was too narrow and the relevant market should include all competition – and not just the competition for plug-compatible equipment.

He said the market should be defined to include time-sharing, service bureaus and other computer systems that compete against the IBM ones.

Bob Evans, president of IBM's Systems Development Division, also testified that IBM had never withheld product technical advances from the market to keep competitors off balance.

He admitted, however, that he was part of a task force in 1970 that had recommended that IBM cut the prices on its peripheral equipment to beat the competition, but he said this idea was rejected and the engineers were ordered to try to develop superior machines instead.

IBM Admits Hiring Practices

(Continued from Page 1)

ecutives who interviewed him that the project couldn't have been completed in that short a time span, but he had discovered ways to improve the 3330 while working for IBM.

The Telex officials, he said, weren't interested in the improvements, only in getting a 3330 into production in the 18-month period.

Wilmer also testified he had worried about taking confidential information away from IBM, especially because IBM was then suing Memorex and an ex-IBMer there for alleged trade secret violations.

Because he felt the time limit was unrealistic and because his conscience bothered him, Wilmer said he rejected the Telex offer.

However, on cross examination, Wilmer admitted the 3330 had already been announced when he was interviewed by Telex and that many of the specifications were in the public domain.

He also related that after the unit was delivered there would have been even less trade secret information that he would have which could not be gathered by others from the units in the field.

He did not have a contract with IBM, he claimed, that would have kept him from leaving the firm and IBM could not prohibit him from using his general knowledge if he went to a new employer.

The next witness for IBM, Forrest Wade, an engineer on the 3830 control unit project at the time he was offered a job by Telex, testified he was offered a 25% pay increase and a stock option if he would go to Telex to develop a similar controller.

He rejected the offer because he felt Telex only wanted him for that one project and it would let him go after it was finished, Wade stated.

In addition, he noted the security at the San Jose plant had become extremely tight after it was discovered that some IBM internal documents had been taken.

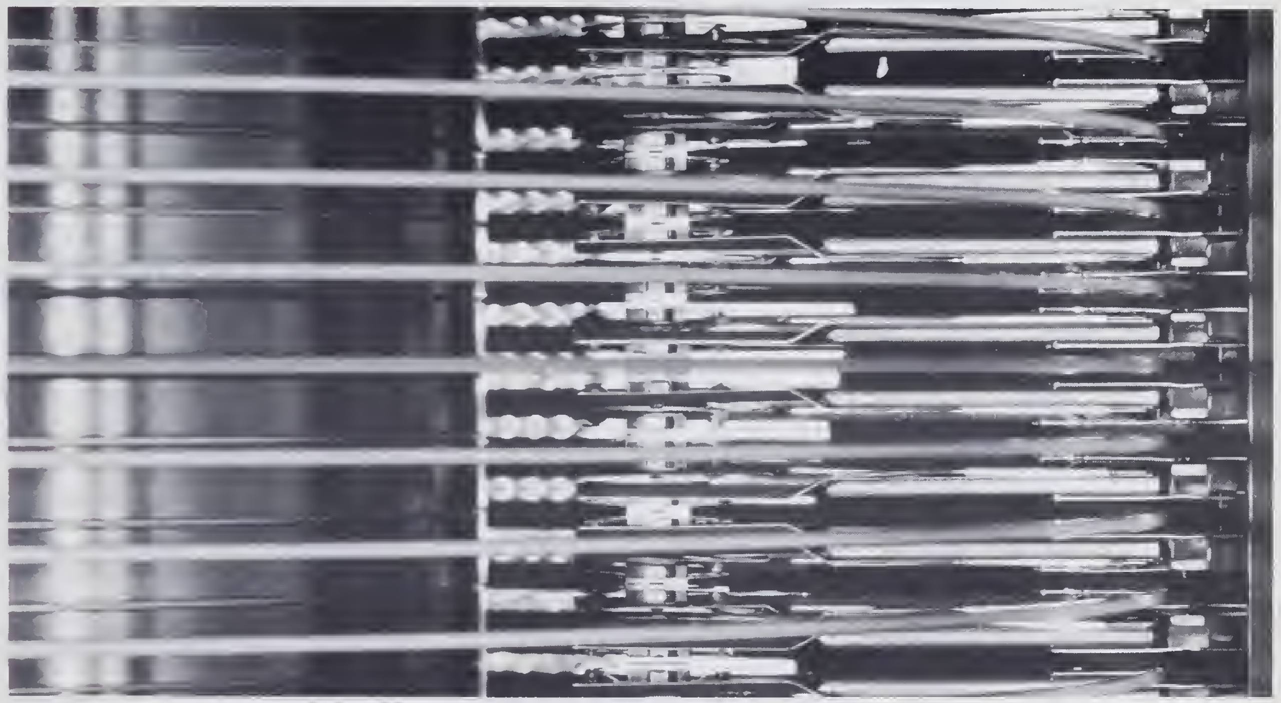
In the area of security, Bob Evans, president of IBM's Systems Development Division, said the group was now spending $2 million more yearly than it had in 1969 for security measures in order to protect against the loss of trade secrets.

Evans added this increased security was "throttling" communication between engineers in different parts of the company.

But, he added, "I can't tell you how demoralizing it is for a development team to work three to five years . . . and then to find within a short time that competition has developed a duplicate" for the product.

DS-330

COSTS LESS, STORES MORE ON YOUR 370



The 3330-compatible disk subsystem by Ampex that operates up to 16 drives on a single controller.

Whatever your 370 configuration, Ampex disk subsystems will save you space and money. Compatible with the 2880 channel, one Ampex controller will handle 16 drives with a total storage capacity of 1.6 billion bytes. As a replacement for your ISC or ISA, the Ampex DC-830 Controller costs you less and performs better.

That's only part of the story. In addition, the DS-330 features: Average access time of 28 milliseconds. Comfortable 32-inch pack-loading height. Visible pack. Plug interchangeability. Dual channeling. Start-stop in 15 seconds with no need to wait for drawer to open. Read-write compatibility. Drive availability in 100 megabyte increments. Self-contained power supply in each drive.

Call your Ampex Computer Specialist at 800-421-6554.

Visit Ampex at National Computer Conference Booth 2417

AMPEX

AMPEX COMPUTER DIVISION
13031 West Jefferson Boulevard
Marina del Rey, Ca 90291, (213) 821-8933

IBM Papers Reveal

FS Series to Replace 370s

TULSA, Okla. –Several IBM documents revealed here in the Telex vs. IBM antitrust suit indicate three systems on the drawing board as part of the IBM FS series of computer systems.

The smallest system in the line is identified as the FS-0 and is seen as a replacement for the 370/135 and lower. The announcement date is found in some documents as December 1976, but other papers seem to indicate the announcement of the entire FS series has been moved to 1975, with customer deliveries a year later.

The Future Systems

FS-1 will be the next larger system and will apparently be aimed at the upper end of the 135 market and the 145 marketplace, even though details are hard to find in the documents.

Apparently IBM has decided to go ahead with two CPUs in the large systems area, the FS-2 and the Thrush, with the FS-2 being equal to the smaller of the two systems described above.

According to one product plan the FS-2 will have four times the internal performance of a 155 and will carry a cost of 15% above the 155's.

The Thrush is scheduled for announcement in December 1976 and will be the follow-up to the 165 and the 195, according to this source.

It will be a multiprocessing system and will have an internal performance two to eight times the performance of the 195 "and will offer a three to four times price/performance improvement," according to this document.

Some Virtual Considerations by IBM

TULSA, Okla. – If you have a virtual 370 system installed and your IBM sales representative is pushing you to add more applications to the system because it won't cost any more, watch out.

In marketing considerations that were mulled over by IBM when deciding to introduce virtual, it was noted that "once a relocate system has been installed, the salesman will be more able to convince the customer to add new applications because initially little or no new hardware will be required. ("Relocate" hardware apparently is IBM usage for dynamic address translation.)

Among the other marketing considerations given by the firm for going to the virtual storage concept were the following:

- **"The IBM salesman will have a new concept involving new function to sell, as opposed to just a straight price/performance kind of product. This is the environment in which he has performed best in the past. He will have considerable flexibility in putting together a sales story for each particular account.**
- **"Because of the new function, the relocate system will tend to attract the purchase customer who had generally been resistent to simple price/performance offerings."**

System Q to Need Relocate Hardware to Multiprocess

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. – "System Q" is the code name for the operating system that IBM is currently developing on a worldwide basis for the FS (Future System) series of computers. And users should be getting some indication of the system as future releases of present IBM operating systems will probably be made with integration into System Q in mind.

According to documents released here, "Q is an architecture of subsystems (comprising hardware and/or software subsystems) . . .which provide a maximum realization of the marketplace requirements."

The system, the documents noted, "is constructed to rigid interface definitions which allow decentralized worldwide development, multiple implementations with differing price/performance characteristics, and facilitates the integration of dispersed activities.

"To this end, Q requires the existence of relocate hardware as a fundamental characteristic and uses that facility to gurantee the integrity of its interface definitions," the previously secret report showed.

Because of the development effort on Q, the document stated that "all present generation systems . . . are interim to Q. Their planned extensions are assumed not to violate the general ground rules of compatibility . . . established between these systems and Q."

On both the NS or 370 line, as well as on the new systems being developed, relocate hardware will be needed to be able to run System Q, the IBM planners noted.

In addition, the System Q, as well as the FS series of computers, will be designed primarily for multiprocessing systems, the documents showed, rather than for simplex systems as are present operating systems.

"The basic design of Q will provide for N-Plcx multiprocessing whcre simplex operation is treated as a subset (or minimum) configuration," the documents said.

"Support will provide for asymmetric configurations but be able to take advantage of any symmetry that exists including fully symmetric systems."

"No assumption or predefinition is made as to the form of interprocessor connection (shared core or cable connected) but recognition is given to the single operational environment that exists so that the configuration can be fully exploited, according to the documents.

Besides requiring relocate hardware and designed largely for multiprocessor configurations, System Q will also have greater capability to support sensor-based applications than the present IBM operating systems.

The Future Software

"The system should provide for full function with viable performance at a given configuration of hardware. Traditionally minimum configurations have been stipulated in terms of core storage size, such as 40K or 256K or 512K bytes of storage.

"This has been true for two reasons. First, core storage has been a significant contributor to the cost of the entire configuration and as such had to be minimized. Second, core storage constraints determined performance levels and the functional content of the system.

"The facilities which the marketplace will demand in this time frame [the introduction of Q] make it impossible to define a system which can reside completely in core storage," the IBM planners admitted.

"The necessity to bring the system to and from auxiliary storage devices as the needs arise adds further complication to the algorithm," they added.

Therefore, they said, "the minimum configuration will be some combination of CPU speed, core storage size, auxiliary devices and channels and some miscellaneous equipment.

"The ultimate concern is really cost in dollars to the prospective installation. Accordingly, the minimum configuration requirement for the system will be expressed in rough dollar terms rather than in some fixed quantity of a constituent component. The actual dollar figure will be derived as the design moves forward and the actual physical requiements of the system become known and the price/performance tradeoffs can be determined."

But even though System Q is apparently designed primarily for what would be considered large-scale users today, the IBM planners plan to extend these features downward with the new system.

"It is a market requirement of the seventies that the facilities stipulated in these requirements be extended to users that are at present considered small-scale users," the report noted.

System Q will be announced for the 370 systems that have a relocate feature during the second quarter of 1974 and will have its first customer shipment a year later, if the firm sticks to its present announcement schedule.

The announcement of Q on the FS series will be made when that series is announced, which is presently expected to be in the first or second quarter of 1975.

Q 360/370 Compatibility Assured

TULSA, Okla. – System Q is still in the development stages, but the IBM software researchers have determined it will be compatible with the present user systems, although the exact approach has not yet been decided.

For second-generation systems, integrated emulation will be used to assure compatibility, the documents released here showed. But for the third generation the solution may be harder.

"For the third generation systems," the documents said, "one or more of the following will be used:

> A. "Coexistence via the virtual machine or virtual operation system approach. Coexistence allows a current user to run his entire current generation system under the auspices of the Q system until he is ready to transist [sic] into the new system.
>
> "The user can elect to convert one or more of his applications to operate directly under Q and continue to run other unconverted applications as he does today (say, under OS/360). Both the converted and unconverted applications run at the same time under System Q within the same hardware. This is the emulator concept carried to the extreme case where the entire current generations system, including the software as well, is integrated under the new hardware/software System Q.
>
> "The technique is not restricted to OS/360 or DOS/360. One or more of any programming system which runs on System 360 or 370 hardware will operate at the same time under the auspices of System Q.
>
> "When operating an old program within a new system structure, the cost performance of the new system will be at least the same as executing the same program in its native environment that is, if one calculated the cost of running a job on the current system as, say, $100, then the cost of running the same job in the new system will not be greater than $100. Furthermore, the job, when all other factors are considered equal, will take approximately the same time to execute.
>
> B. "Program, data and operational control compatibility via support of the 'Interchange Environment' that provides:
>
> > 1. High-level language (Fortran, Cobol, PL/1, etc.) compatibility for source programs.
> >
> > 2. Data interchange (compatibility) via AM/I (Access Method/I) and BSAM data structures.
> >
> > 3. Operational control interchange via the Common Command Language."
>
> C. "Within its implementations on NS [370] and FS, Q will maintain both upward and downward compatibility for programs and data."

However, where conversion of programs is necessary, IBM is already planning to help the users.

"Where conversion of programs and/or data is required to obtain the improved performance or additional functions offered by Q, conversion aids will be provided to make the transition as easy, economical and efficient as possible," the IBM planners promised.

"However," they noted, "by providing the coexistence capability, conversion will become an installation option rather than a mandatory requirement."

National Welfare Index Proposed

By Judy Kramer
Of the CW Staff

NEW ORLEANS – A national computerized welfare recipient index has been proposed by the newly organized National Welfare Fraud Association (NWFA).

The group has suggested that the Department of Health, Education and Welfare set up and administer a national data bank which could be linked to computer systems in all the states. The group is currently having talks with HEW, according to Richard Peterson, president of the NWFA, but the government agency has not indicated whether it would favor such a data bank.

(Soon-to-be published results of the automated personal data banks hearings by HEW could affect this decision.)

The purpose of such an index, Peterson said, would be to stop people from shopping around for welfare and to eliminate costly duplications based on fraudulent misrepresentation.

"Recipients have been prosecuted for receiving aid to which they were not entitled in as many as 22 jurisdictions simultaneously," he added.

Under the proposed system, when a state or county receives an application for welfare, it could check the national index to see whether the person is receiving public aid from another county or state.

Peterson indicated it would also benefit the recipients. If a recipient moves, he would not necessarily have to reapply for aid – his records could simply be transferred.

Input for the system would come from the states but the files would be maintained and paid for by HEW, according to the association's plan.

Target date for the beginning of such a national project is Jan. 1, 1974, Peterson said.

Democrats Set Up Guide to Safeguard Elections in '72

WASHINGTON, D.C. – The parties and party workers "remain the most important deterrent to fraud and the safeguarding of accurate elections," especially computer-based elections, according to a workbook passed out by the Democratic Party last year to help election observers detect possible fraud in the election process.

The document noted "there are consistent errors in the results" from punched-card elections even though there has never been a documented case of fraud or sabotage which has led to criminal conviction.

It also noted that there may have been cases where the election results were changed by either intentional or unintentional errors which have never been caught because they could not be identified at a later date.

Noting that the ballot-counting procedures could sometimes be quite confusing, the document stated that "in this confusion, many errors may occur which are not detected, or there may be extraordinary opportunities for election fraud."

There is also a problem in ballot security, the report showed, and recorded cases where ballots were misplaced.

To help control the possibility of ballot switching, the report recommended that all of the ballots be counted at the precinct and that the precinct then reconcile this total with the number of ballots counted at the election center later.

What Did They Learn?

NEW YORK – James Farmer of Systems Research, Inc. will discuss some of the results of the Democratic Party monitoring activity in the vote-tampering area at a National Computer Conference session on "Computers in the Elective Process" scheduled for June 5.

Also, the ballots on punched cards should be checked carefully to make sure that write-in voters have not voted for too many people in any one category since the computer cannot detect the write-in.

All punched card ballots should have the precinct number on them, the workbook said, because "if this is not done, it is possible to switch the ballots and the count error not be identifiable later."

Furthermore, "the computer programs which count the ballots or which perform a media conversion from the card to an image on magnetic tape or disk offer a high risk of innaccuracy," the workbook stated.

"Furthermore, there is an opportunity to 'rig' the ballot count which would be undetected by most logic and accuracy tests," the workbook stated, noting "these methods are well-known and documented."

To help prevent this, it said the source programs should be made available to computer specialists to check for any possible areas of fraud and for "code which is not used, used under special circumstances or which appears extraneous."

A listing of the object code of the compiled program should also be obtained for later checking with core dumps, it said.

"Frequently, the program used for counting the ballots is not the identical program used for the logic and accuracy tests or filed with the appropriate state agency . . . but it is imperative that the program used be identical to the official program; this is best determined by comparing the election night core dump to the source and object code listing," the workbook stated.

"On election day, observers should see the program initiated, a logic and accuracy test taken, and a core dump taken," for later comparison to make sure that the comptuer program used on election night is the valid one.

Even though "a logic and accuracy test of this size may take almost as much time as the election count itself . . . it is the only way to assure an accurate count," the document continued.

Vote Fraud Feared

(Continued from Page 1)

effective. He indicated that since it occurred late in the campaign (October) there was a fear that the programs that had been developed for vote counting had already been tampered with and that that tampering could not be caught so late in the campaign.

The basic strategy of the last minute effort, according to Max Factor Jr., one of the men who helped coordinate the last minute briefing of state election officials, was to warn the people in the field of the possibilities of fraud and give them some basis with which to detect the possible fraud.

Basically, according to James Farmer, who conducted the briefing sessions for the party, the effort was aimed at deterring possible frauds by having "trained personnel who observe the process and hence indirectly pressure election officials to increase security measures and suggest to potential criminals that the chances of getting caught are markedly increased."

In addition, he said the training program used was aimed at documenting occurrences of vote tampering, so that possible action could be taken after the fact to apprehend and prosecute violators.

IBM 370's

are leased to save money.

CSA leases provide long term economy, while customers enjoy the flexibility of upgrading and early termination.

For further informabon, please call (617) 482-4671

Computer Systems of America, Inc.
a computer equipment leasing company.
79 Milk Street, Boston Mass 02109

Send for the 12 questions you should ask of any leasing company before you lease.

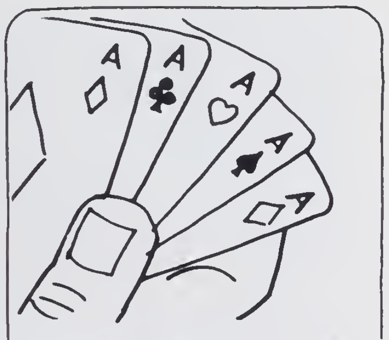
Name________
Title________
Company________
Address________
City________
State________ Zip________
370 on order ☐ installed ☐
Model________ Due Date________

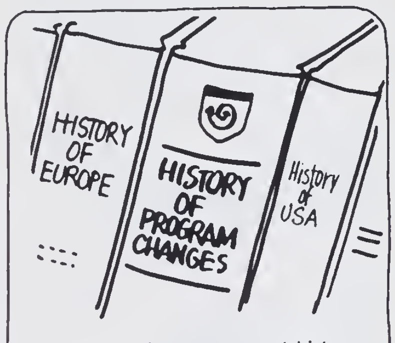
Did You Know?

One of a series MAKING IBM INSTALLATIONS WORK BETTER

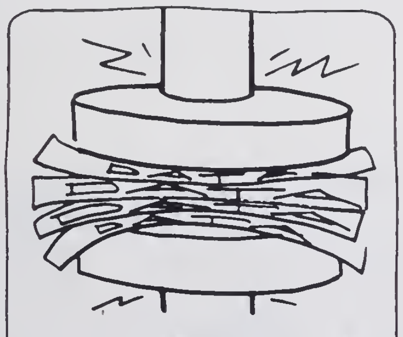
ADR's 'Librarian' System can protect your programs, your management, & your job.

The 'Librarian' simplifies program retrieval, updating & maintenance.


Eliminates card-handling hazards and provides automatic back-up facilities.



Permits storing a permanent history of program changes.


Compresses data to save storage space and computer time.

Offers a password facility & software lock to increase protection & security.

Permits string scanning and/or replacement.

The LIBRARIAN is at work at over 600 companies around the world . . . maintaining, auditing and protecting source programs. Shouldn't your company gain these benefits, too?

Programs represent one of your company's major assets . . . perhaps its largest. Whether you're a programmer, data processing manager, director, controller, president, or company friend, if you think programs are valuable, then protect them. Look into the LIBRARIAN from ADR. You owe it to your company.

For additional information, just send us the attached coupon, or contact any ADR office.

APPLIED DATA RESEARCH THE SOFTWARE BUILDERS®
ADR software products: in use at over 2,500 installations worldwide.

APPLIED DATA RESEARCH, INC.
SOFTWARE PRODUCTS DIVISION
Route 206 Center, Princeton, New Jersey 08540
Telephone (609) 921-8550

Yes, I'm interested in The LIBRARIAN®

Name
Company Title
Address
City State Zip
Telephone
Computer Configuration
I am also interested in
☐ MetaCOBOL® . . . for increased productivity
☐ AUTOFLOW® . for maintenance and debugging
☐ SAM . . for planning
☐ ROSCOE . for on-line program development
☐ PI SORT for faster sorting

U.S. offices in Atlanta, Boston, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Pittsburgh, Princeton, St. Louis, Washington, D.C.
Foreign offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Puerto Rico, South Africa, Spain, Sweden, Switzerland, Taiwan, West Germany

'Honeymoon Is Over' **But Reality Hasn't Materialized**

Soviet Diagnoses State of Cybernetics Medicine

Novosti Press Agency

(Interview granted by
Professor A. Popov to V. Demidov:
"We Are on the Threshold of a New
Age in Medicine")

Science in the USSR

About 10 years ago medical cybernetics had its honeymoon. They were talking and writing about diagnostic computers which would take but a split-second to diagnose the most difficult cases!

Years have passed, however, and even children have their encyclopedia of cybernetics – a book with fine pictures, but there does not seem to be much talk about diagnostic computers anymore. What can be the matter?

"Go to Kiev to satisfy your curiosity," my friends said. There is an Institute of Cybernetics there. See the laboratory of Professor Popov. He will tell you all about it."

So I came to Kiev. I saw the professor in a spic-and-span building of the institute on the outskirts of the city.

Q. Why isn't there any talk about diagnostic computers at present?

A. Because there aren't any.

Q. But just a few years ago . . .

A. A few years ago it all seemed much easier than it does now. We knew too little then. Because of that our understanding of the problem was somewhat primitive. Today, however, we have grown if not cleverer, then more experienced so that we are beginning to appreciate the gigantic scope of the problem we are out to solve.

Our research group is called the laboratory of medical information systems – information systems rather than diagnostic computers. The difference is by no means accidental for it comes not out of a desire to put it more scientifically, but the changing of one name for the other is connected with the entire process of getting a clearer understanding of the problems involved.

What did we want before? We wanted the computer to diagnose a case on the basis of the distinguishing features of the disease. This kind of approach contained a gross error. It was like taking an instant picture, i.e., ascertaining the state of the patient at the moment of examination and using that for a final inference.

How could we forget that a disease is not the state of the organism at a given moment, that it does not come all of a sudden. The changes in the organism accumulate slowly, one added to another, and only then do they manifest themselves in some form.

It is an elementary thing. When a patient comes to see his doctor, the latter, above all, asks him about his past. Unless we know the past any treatment becomes absolutely senseless; it is as clear as ABC.

Next comes the examination: collecting information about what is happening to the organism now. It is only following this stage that a diagnosis is made and a certain treatment is prescribed. Later we observe the way the patient responds to the medicines and treatment prescribed, marking the progress of the changes. Accordingly, we make corrections in the diagnosis and the treatment.

It looks very complicated indeed to think that we wanted the computer to take over making a diagnosis which is but a tiny part of the process. What must be done is not merely making a diagnosis but giving a comprehensive treatment.

Q. Do you want the computer to take over the entire process?

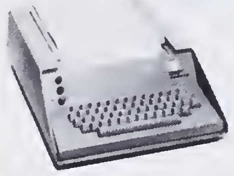
A. Not exactly. The computer will not be entrusted with treating the patients, despite what the supporters of an all-round introduction of cybernetics into medicine may claim. To follow this kind of reasoning we may come to a ridiculous assertion that medical men will get replaced by a kind of cash register: a patient comes up to the computer, pushes the button, the computer will give out a check for the drugs – you may go ahead and take whatever treatment is prescribed. To think along these lines will inevitably mean that doctoring as a field of scientific creative activity will come to an end.

What is the situation at present? About two decades ago the press raised the alarm: the doctor takes up too much time writing, whereas he has less and less time at the bedside of the patient. Have there been any changes since then? There is much more paperwork at present.

Our point of view is: the computer is to take over all the paperwork – collecting information, storing it, keeping tabs on the patient's condition, making general-

(Continued on Page 7)

STILL
WAITING?



WE'LL SHIP YOU
A CDI TELETERM®
IN 7 DAYS*

OR ELSE.

Get a CDI Model 1030 TELETERM portable time-sharing terminal by next week. Just send us a bona fide purchase order for $3,100. If we take longer than 7 days to get your TELETERM on its way, we'll give you a whole case of paper. Free.

The CDI 1030 is a lightweight, quiet, reliable terminal using a thermal printing technique. It operates at 10, 15 or 30-characters per second and is perfect for time-sharers on the go.

So don't just sit there and wait. See how fast you can get a TELETERM of your very own!

*A.R.O.

a TECHVEN corporate partner

COMPUTER DEVICES INC
9 Ray Avenue
Burlington, Mass. 01803
(617) 273-1550

*Reg. U.S. Pat. Off

A money-saving idea that IBM doesn't like to talk about.

It was probably someone at IBM who invented the term "mass memory" a decade or so ago to describe their tape drives, disc drives and drums. Maybe they were "mass" storage back then. But in light of today's data storage requirements, they really have to be considered "mini memories."

And as you've probably noticed as your storage requirement has grown, so have the costs of your growing stable of discs and tapes.

While IBM keeps on grinding out the tapes and discs, we started thinking of ways to cut costs, cut down handling and put more data on-line in a real mass memory system.

Enter MASSTAPE.™

We introduced the result of this thinking. We called it MASSTAPE, the first commercial on-line mass memory system.

By using a high density data storage system we developed during the Apollo program, we were able to find a way to put your active tape library on-line.

Be sure to see us at the NCC '73 at Booth 2427.

The basic system can replace up to 32 tape drives and four controllers at less cost and provide greater throughput.

Day of 'Aesculapian Computer' Still 10 Years Away

(Continued from Page 6)

Science in the USSR

ized data available at the request of out-patient hospitals, etc. In this way the doctor will get back the time he now spends on paperwork.

We shall give the doctor back his time to think about the information put out by the computer. Decision-making is the prerogative of the human being.

Look at the way a doctor today makes the round of wards. He comes into the ward and comes to one patient after another like he did a hundred or three hundred years ago, keeping all relevant information in his head while later he tries to recall it and put it on paper. If, however, this information is collected and stored by the computer at the patient's bedside, there will be no loss of time or information and that alone will make the work of the doctor more efficient.

What is bad is that present-day computers cannot do anything like that. They can do computations involving the design of an aircraft wing, the missile trajectory or machine-tool control, but a human being is a far too sophisticated organism for them. I have in mind the computers of the "second generation" like, for instance, the Minsk-22 computer.

When computers of the third, fourth or, better still, fifth generations come into being – computers with a large memory store, fast action, capable of understanding everyday human words or, better still, speech – then all I've been talking about will become a reality.

Q. When will it be?

A. No sooner than in some 10 to 15 years' time.

Q. In the meantime, are we just to sit and wait?

A. Not at all. Do you think that if computers like that were available at present we would be able to use to the full all their potentialities? That would not be the case. They would simply go to waste as the doctors are not as yet prepared to handle them. The doctors cannot think the way computers are accustomed to "thinking." They cannot communicate with the computers.

What does "communicating with the computer" mean? Above all it means being able to express oneself with precision and in no uncertain terms. However, if doctoring is an art then the terms it uses are most ambiguous, as is the case with any art. Take, for instance, myocardial infarction which has dozens of nuances for which we have no names so far. How can we carry on a dialog with the computer? The most important thing now, therefore, is to do preparatory work.

Q. In other words, you want to get doctors to think in a computer-like fashion before the computers are available.

A. Precisely. We are summarizing all the characteristics of the human condition into a system which can be easily put into the computer. On the other hand, these characteristics are arranged in the case history in a way which makes it more convenient for the doctor to do conventional recording of the information.

Take, for instance, temperature. The case history has a special table complete with figures designating degrees with every other decimal marking. The only thing left to be done is to put a cross in the necessary square.

What are the advantages of this kind of formalized recording? In the first place, it tends to discipline thinking for nothing can be omitted or forgotten. Secondly, the essential recorded data becomes simpler, and assumes, using the cybernetic parlance, the yes-no character.

What is most important, however, is that a "formalized" case history like that can be easily translated into a computer language and put into the memory store. A punch operator will be able to put it on punch cards without any additional instructions from the doctor.

A conventional case history does not lend itself to be punched for it has too many ambiguous and vague things. Talking about computerized diagnostics some 10 years ago, we somehow neglected this side of the problem, though there was talk about a data store which was to accumulate information about diseases and patients.

At present we are only approaching a new age in medicine. Our dreams have become more serious and we do not expect cybernetics to be a miraculous cure-all. What kind of cooperation will evolve between the doctor and the computer and what will it lead to are the problems facing us today.

Boeing Studies Aircraft Noise

SEATTLE – The Boeing Co. will undertake a project for the Federal Aviation Administration to develop data necessary for identifying aircraft noise patterns in the vicinity of the airports.

During a six-month period, Boeing will collect and analyze existing noise and performance data on its four in-service commercial aircraft – the 707, 727, 737 and 747. Final data, to be presented to the FAA in computer program and graphic form, will identify the different aircraft performance and noise source characteristics.

"The computer programs and graphics will be valuable for the development of land use planning tools for areas near airports," FAA administrator Alexander P. Butterfield said. "The data will enable a more accurate delineation of noise patterns on the ground."

The smallest MASSTAPE storage system puts the equivalent of 5,000 tape files on line... 14 billion bytes.

The system's data staging provides 32 device addresses. It bursts data to and from your computer at over a million bytes per second, saving hours of costly computer time each day.

This twin-computer center with a 28-billion-byte MASSTAPE system can result in a saving of over $400,000 per year over current methods.

The basic MASSTAPE system rents for less than the tape and disc drives it replaces.

Save up to $1 million a year.

What's more, with any MASSTAPE system, your cost of on-line data storage drops from $7-15 per million bytes per month to less than $1.00.

In a large multi-computer center MASSTAPE can save up to a million dollars a year. And that's including all costs of MASSTAPE.

In a typical twin 360 or 370 installation, you can save over $400,000 a year in hardware and labor savings.

(We will be glad to document this in your own computer center.)

The system is compatible with 360/370 systems under OS without costly reprogramming. And we'll be glad to discuss adapting it for users of other large systems.

MASSTAPE is installed at Grumman Data Systems' own computer center. And it's in production for several top Fortune 500 companies.

If you're interested in saving money, please contact our sales office nearest you or Grumman Data Systems Corporation, 711 Stewart Avenue, Garden City, L.I., N.Y. 11530. (516) 575-3034.

MASSTAPE by Grumman Data Systems

Eastern Region (212) 532-1122
Washington, D.C. Region (202) 872-1800
Central Region (312) 654-2755
Western Region (213) 322-6990

NOW!

328 and 337

Acoustic Coupler/Modems

$125.00 NEW
FULLY GUARANTEED

IMMEDIATE DELIVERY

- EIA OR TTY INTERFACE
- 110 OR 300 BAUD

CALL
(214) 252-7502
OR WRITE

vardon
& associates. inc.

930 N. BELTLINE
SUITE 140
IRVING, TEXAS 75062

Editorial

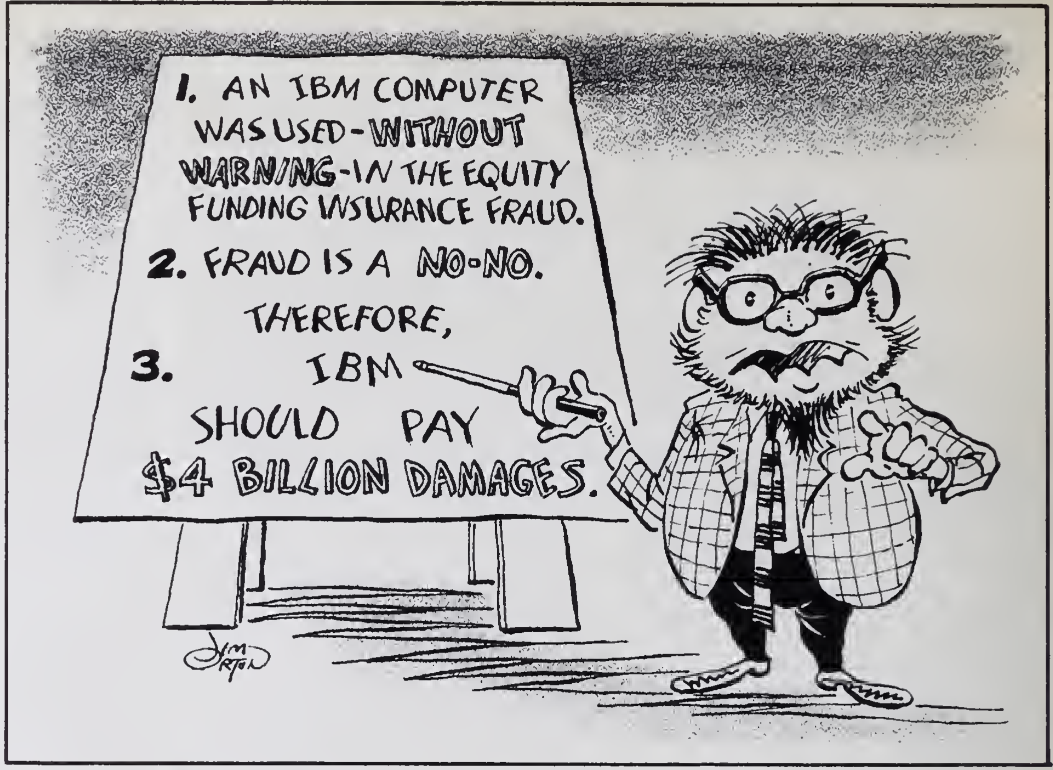
99.9% Secure?

If computer systems cannot be made 100% secure, as suggested by a Navy Department official recently, managers of computer centers must resort to specific means to protect their data.

As suggested by Cmdr. Jan Prokop, users should spend their money where it will do the most good, depending on their individual situations. Such expenditures, it would appear, could be made by implementing effective security-clearance procedures and physical-access control systems, as well as by designing secure computers.

An investment must also be made in time, the time it takes to generate a security "attitude" among DP employees; an identification with corporate or company goals, and not simply the day-to-day operation of the DP center, is also important.

Prokop's comments come at a particularly significant time, in that IBM is expected to give its first annual report on its five-year, $40 million security study, during the National Computer Conference next month.


1. AN IBM COMPUTER WAS USED - WITHOUT WARNING - IN THE EQUITY FUNDING INSURANCE FRAUD.
2. FRAUD IS A NO-NO.
THEREFORE,
3. IBM SHOULD PAY $4 BILLION DAMAGES.

'What Do You Mean, You Don't Understand That Last Step?'

Letters to the Editor

Vote System Troubles Show Auditing Need

Re: Peter Rijken's letter of April 11 and the Datavote programming system.

I wish to thank *Computerworld* for its editorial support of the need for computer auditing (April 11). This editorial apparently is the outgrowth of the article in which I discussed the insecure features of the Datavote vote tally system [CW, March 7].

We are pleased that CW had the wisdom to expand the problem to all data processing systems. This is an honest admission that computer systems are fallible and are subject to human mistakes and/or fraud.

Our particular experience with Datavote only confirms the need for computer audits. Rijken's letter correctly stated that Honolulu City and County employees aided state employees during elections, but he neglected to mention that Honolulu computer center employees are the only people in Hawaii who know how to operate the Datavote vote-tally system.

Unfortunately, knowing how to work with a system and understanding the program logic are not the same thing. Even though we have access to the source cards, the program logic is a complete mystery to everybody in Hawaii.

The problem with the Datavote system (and any other vote-tally system that I am aware of) is that there is no provision for feedback to indicate it is operating correctly.

Since feedback is missing, I cannot conceive of any technique except an audit to assure the voters that the program can perform properly. Even an audit cannot guarantee an error-free election process, but at least there is an attempt to determine if program errors or fraud are present.

The "elaborate testing procedures" and "logic card accuracy tests" hardly qualify as feedback. All they prove is the system worked as advertised (not necessarily properly) during the test periods. Appealing to the League of Women Voters, the Bar Association and the press as authorities on the accuracy of a data processing system is ludicrous.

This appeal to authority may be appropriate for a Madison Avenue advertising agency, but Datavote is concerned with the accuracy of a most important part of the democratic process. That is hardly in the same category as selling soap or toothpaste.

I do not understand why Rijken believes unqualified acceptance of his system is so important. The editorial summarizes the whole situation:

"Data processing system vendors . . . should welcome those who are prepared to assist in auditing and even in financing the audit."

If Datavote is accurate, Rijken has nothing to fear from an audit and Datavote would become more marketable. He should be lending support to what appears to me to be a common cause.

Gerald L. Mann Jr.
Director of Data Systems
City and County of Honolulu
Honolulu, Hawaii

RPG Affair Centers On Documentation

I would like to discuss what I believe is the key issue in the RPG vs. Cobol controversy. This is the question of documentation.

There are three main kinds of program documentation: system, operator and program logic documentation, each with a specific purpose. System documentation describes the objectives of the system and the flow of files and programs. Clearly, this is fairly language-independent.

Operator documentation tells how to run the programs. Except for mounting instructions, all RPG programs have consistent operating procedures and halts which are written up by professional technical writers in the manufacturers' manuals.

In comparison, few Cobol programmers do more than program and describe dead-end halts. They can hardly devote the time to thinking through and documenting the detailed recovery procedures that we expect. Furthermore, few operators will spend much time trying out the generally untested bypasses an individual Cobol programmer might provide.

Finally, we come to program logic documentation. The main use of this material is the modification of existing programs, particularly by different programmers.

Here I feel that a programmer experienced in either language will find the actual code, which describes what the program actually does now, is more useful than English Language comments, which describe what someone thought the program did when the comments were written.

Both languages provide a comment facility using an asterisk in a certain column. But the Cobol programmer must document Mickey-Mouse functions such as file merging, end-of-file correlation and sequence checking which the RPG programmer can find fully, professionally and consistently documented in the standard manuals.

Similarly, the RPG maintenance programmer can take these functions for granted, and concentrate on the unique functions of each individual program.

To the extent that professionalism, in program documentation consists of meeting the present and future needs of one's organization in an efficient and expeditious manner, RPG is as professional a language as any, and perhaps more so than some.

Michael Gershman
The Singer Co.
Ozone Park, N.Y.

Consumer Protection

Re: "No Credit Here" [CW, April 25].

As the owner-manager of both a credit bureau and a DP service bureau, I feel the editorial indicates a complete lack of knowledge of consumers, credit bureaus, creditors and their mutual relationships.

In the guise of consumer protection *Computerworld* has gone off "half cocked," armed with little knowledge and few facts, endorsing, nay, pushing for a stronger "Fair Credit Reporting Act."

Credit is not yet a right guaranteed by the Constitution. It is a privilege. To link consumer rights and credit shows a lack of understanding.

Credit bureaus do not issue "credit ratings." They do record facts, public records, creditor ledger information and assemble these in a factual credit report. The consumer makes the credit record, not the credit bureau.

The cost of credit is borne by the consumer. Therefore, to issue credit wisely and keep the costs of credit at a minimum is fundamentally the finest form of consumer protection.

Richard L. Vennell
Park Ridge, Ill.

The Buffered Way...

In reply to the article on the advantages of a key-disk system over keypunches [CW, April 11], there are some common misconceptions concerning cost reductions which will result by replacing keypunches with a key-disk system. I cannot agree that key-disk will result in greater keystroke/hr. I cannot agree, in fact, that any increase in keystroke/hr will be the result if you replace buffered keypunches with a key-disk system.

Inasmuch as the elemental times required to keypunch are the same on both types of equipment, the keystroke/hr will not be affected.

The major difficulty, as I see it, is that these articles generally fail to stress the difference between the purely mechanical keypunches of the past and the new buffered keypunches widely in use today. The use of electronic memories in the buffered keypunches (as in the key-disk systems) increases productivity rates equally.

Reformatting as a source of savings is also mentioned in the article. In my opinion, reformatting for the reduction of duplication of data in multi-card records has ceased to be considered a real savings with the advent of electronic memories and their nearly immeasurable processing speeds.

When discussing increased keystroke/hr, it might be well to remember that the real dynamic advance in productivity came about with the introduction of the electronic memories which generally increased throughput by some 20%.

Increased productivity today is the result of a systems approach to data preparation and the selection of reliable equipment to best implement that system.

John F. McCarry
Vice-President, Marketing
Peripheral Sciences, Inc.
Norristown, Pa.

Keep 'Safe Approach'

The April 25 editorial discussed the use of formats other than 80 columns. As a manufacturer of CRT terminals, we have made extensive studies of the normal applications of operator to computer interfaces.

For reference data, the computer user would like all of the information in the system available to him at the rate he can move his eyes. For new information being presented, reading is most rapid with relatively narrow columns (witness newspapers of 30 ro 40 characters in 1-1/2 inch to 2-1/2 inch widths).

For hardware efficiency, binary numbers are decidely better, so the most desirable character count would be 32, 64 or 128. We have followed the newspaper lead and gone to 32 characters, reducing the tube size and the overall weight and size of the system at the same time.

Interestingly, almost every CRT display manufacturer started with less than 80 characters on a line (typically 40) and was forced to go to 80 "because that's what we're used to."

Don't "discard the safe approach"; simply decide what is needed for the application!

Byron M. Cole
Vice-President
Car-Mel Electronics, Inc.
Los Angeles

(other letters and viewpoints on Pages 9 – 11)

Data Collection Systems Are Not Always Proper Tool for Control

The Taylor Report

By

Alan Taylor, CDP

A few years ago, the State of Ohio put in a series of Wide Area Telephone lines (Wats). The lines concerned have been greatly overused, and, owing to design of the telephone system, this overuse has resulted in large parts of a complete telephone company station being dedicated to handling these calls.

A solution to this, scheduled to go into effect in September, will probably reduce the number of calls attempted through the network by 40%.

Howver, this solution does involve the collection of a considerable amount of data, and therefore relies to some extent upon the known human objection to being crossexamined unnecessarily. (The data mainly comes from those who are now using the system correctly.)

The data processing professional's questions then are:

- Is the State of Ohio's solution to its telephone load problem a professionally acceptable piece of data processing?
- Is it the best solution available?

Reduced Collection Alternatives

Taking the second question first, there are a number of alternative methods available. The amount of data to be collected is unnecessarily high. There is, for instance, no real reason for Ohio to collect from-and-to data on any calls made while a system is not being overloaded.

There is some reason to collect identification data on calls being made while the system is overloaded. Even so, it is unnecessary to take a 100% from-and-to census; an adequate sample which will allow the identification of those people who are abusing the privilege is all that's needed.

Another alternative to the proposed Ohio data collection system is for the phone company to work for the proper timing of calls.

For instance, assume there were three types of dial tone. Let us say that one meant there was a line available and you could expect to get your call through. A slightly higher dial tone could be used when the loading on the system was such that a user would have to dial at least three times before getting through. That would move some demand from the overload period. After all, people do not like to waste time unnecessarily, and will tend to make calls at a time when they can get straight through.

Then suppose there was a third level that indicated that on an average you could expect to dial eight times before you got your line.

Even without *any* collection of data, the prospect of having to dial eight times would deter many callers, even diverting urgent calls to other available communication methods. It would assist in the smoothing of the loads.

Improved Information Exchange

Another way of reducing loads without involving data collection is to start shortening telephone calls.

Many firms shorten telephone calls. This pursuades people to increase the density of information transmitted per minute.

The situation now is that all these alternatives – reduced data collection, reduced load systems and reduced call duration – have been passed up by Ohio in favor of a "Big Brother" data collection system, apparently without even trying the other methods.

Big Brother data collection, where data is collected for either unknown reasons or reasons which are basically inadequate and distributed to unknown people, makes this system a form of a threat. It acts in the same way a random police searching system works and I do not believe thinking DP people want to get into it until it has been shown to be unavoidable.

Under these circumstances I feel the State of Ohio should, even now, change its plans. As long as a person making a telephone call does not know that the system is overloaded and is not even given the opportunity to know this, I do not see how any case can be made for any data collection operation – and certainly not the one currently planned.

This is not to say I am blaming the people who have designed the system. I do not expect anyone has ever asked them to consider the alternative methods. I do not expect them to realize that data collection is not the only way of information control I do not expect computer people have even considered the possibility of reducing the loop-time involved between the commissioning of a piece of unfortunate behavior (such as calling over an overloaded system) as being any part of a data processing situation or evaluation.

And I do not really blame the people who have failed to teach them these elements of professional data processing. They have given the courses on "how to," not on "when to."

But I do expect that now the data processing profession is growing up and is able to use data processing selectively so that the professional disadvantages of data collection, as well as its advantages, will be included both in data processing courses and in data processing decisions.

At least they will any time that they want to call themselves professionals.

© Copyright 1973 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.

Questionnaire on Data Collection Systems

1. Do you believe unnecessary data collection should be avoided?

( ) Yes ( ) No

Comment ____________________

2. Do you believe the institution of a data collection system as a control device, without testing available non-data collection control systems, is unprofessional?

( ) Yes ( ) No

Comment ____________________

3. Do you believe professional data processing education should teach alternatives to data collection and the disadvantages of using data collection as a control system?

( ) Yes ( ) No

Comment ____________________

4. Do you believe professional data collection education should do likewise?

( ) Yes ( ) No

Comment ____________________

Name ____________ Professional Position ____________

Organization ____________ Address ____________

Society Memberships ____________

After completion, please return to Alan Taylor, c/o The Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.

Letters to the Editor

Which Language Is Best For Your Environment?

Although I do not completely disagree with Marvin S. Ruth's letter concerning RPG or RPG-II [CW, March 28], I believe the language deserves some positive support. Perhaps in a large shop where a staff of three or more programmers is required and on-line systems are installed or in a sophisticated multiprogramming environment, RPG or RPG II may not provide the flexibility or power required.

One must be reminded that RPG is the acronym for "Report Program Generator." When one tries to use the language in such a way as to require additional program runs to perform a given task, perhaps the job should be written in another language.

We have found through proper system design, using a mix of Cobol programs and RPG II programs (creating simple sequential input to a series of RPG programs to process reports), the language has been quite adequate.

It's tremendous to have an extremely efficient program, but ask yourself, How efficient is the average Cobol program? How much time was spent compiling and debugging?

If a person is proficient in the language, an RPG program to process a fairly complex report can be written, keypunched and operational in one day. As far as documentation is concerned, lack of adequate documentation is a management problem more than a language problem.

The question is what languages are best for your shop or environment. When management needs a report, it really doesn't care what language it's written in. It needs the data to run the company and make decisions based upon the data.

Anthony B. Buscaglia
Director of DP
Niagara Frontier Services
Buffalo, N.Y.

Both Have Advantages Based on User Applications

Both RPG and Cobol have their distinct advantages and disadvantages, based upon the user applications and systems hardware involved. For those who feel RPG II is a limited language, merely a step beyond sort and tab, I suggest they read recent texts and manuals, and objectively evaluate the capabilities of RPG. They will discover a versatile language, capable of solving all commercial applications and limited only to the imagination and ability of the programmer.

With few exceptions, all the elements of Cobol are available to the RPG II user through tables, arrays, exits to subroutines, etc.

To those who tout RPG as the panacea of the data processing industry, I also suggest they read and objectively evaluate current texts and manuals concerning Cobol. Cobol is truly at home on the large system with high volume files, an area where RPG can provide little competition.

Each language has advantages within the operating environment in which it is utilized. Perhaps one day, in the not too distant future, the unique advantages of both Cobol and RPG can be combined to create a new language which will completely fulfill our needs as programmers and end this debate of RPG vs. Cobol.

Frederick W. VonKutzleben
Arthur J. Gallagher & Co.
Chicago, Ill.

Give Programmer the Option

As the Cobol-RPG controversy goes on, the RPG enthusiasts claim great labor savings in programming with minimal sacrifice of efficiency, and intimate that Cobol programmers are so enamored with their bits and bytes that they are expending more labor than necessary to obtain reasonably efficient programs.

The Cobol supporters, on the other hand, claim Cobol offers more flexibility in systems design as well as more efficiency in program execution and suggest that those who program in RPG are perhaps not competent enough to use Cobol.

In our shop, where most of those programming have the option to use either language, we find that both sides have their merits. RPG is usually used where speed of programming is critical and efficiency of operation is only of secondary importance. Special requests and annual reports fall into this category. Cobol is used for heavily used programs and in critical systems.

Joe Scanlan
Providence, R.I.

Use One With Fast Results

Re: Marvin S. Ruth's [CW, March 28] and Norman F. Allen's [CW, April 25] letters complaining of the horrors of RPG and RPG II.

Ruth has completely overlooked what RPG was designed for – report generation! I am really sorry that he cannot do on-line systems work with RPG II, but you can't haul concrete in a Cadillac either.

Allen states in his 11-year career, he has never seen an installation that uses these quickie languages that wasn't an operational nightmare.

My experience covers 23 years, doing everything from running a sorter to directing the DP function. Once IBM dropped the 1401 RPG and came out with 360 RPG, the programming area started changing. Programs needed today were ready today. I speak not only of quickie print jobs, but also complex data manipulation.

When a crisis arises, I want results now, not next week or a month from now. When management wants an answer, it wants it now, and we deliver, but we keep an open mind. If we can get the answer in a hurry with Cobol, we use it. But in most cases we have to rely on RPG or RPG II. My shop is approximately 90% RPG/RPG II and it runs very smoothly.

P. Robbins
Director of Operations
NMU Pension & Welfare Plan
New York, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Blame Weak RPG Shop on People, Not the Language

By Charles T. Pritchard
Special to Computerworld

Viewpoint

I have remained silent just as long as I can concerning the series of RPG vs. Cobol letters that have been running in *Computerworld*. In their haste to make their ideas known, previous writers have displayed the three characteristics which so often cause the data processing staff of an organization to be thought of as not very professional:

- They like to call names and make cute but degrading statements.
- They are grossly ignorant of instruction sets, compiler features, coding techniques, etc. of any language other than the one they prefer.
- They miss the point.

One person said, "Add that company to my list of places not to send my resume." May I respectfully ask to have my company put on his list. Regardless of what his skills are, I don't need an employee with his attitude.

Remember When?

It is obvious to a good RPG programmer that the Cobol enthusiasts have not seen an RPG manual since the days of the 1401. (Yes, Virginia, there was RPG for the 1401. It wasn't very good, but it was there.)

Any resemblances between 1401 RPG and RPG II are purely coincidental. The RPG man, in turn, defends his language by offering coding tips and debugging aids. Those things belong in classrooms – not in Letters to the Editor.

Another writer saw a relationship between coding in RPG and poor run books. Poor run books are caused by poor management. Definition of programming, documentation and operations standards is a management function. I fail to see how weak management can be blamed on RPG.

Cobol programmers throw a few crumbs to RPG programmers by conceding there are probably a few applications somewhere that might be better written in RPG. I suggest the reverse.

RPG for All

Virtually all commercial applications could be better written in RPG if only there were enough good RPG programmers available. Unfortunately, good programmers move upward in management. Most firms, however, would rather have an application (even an RPG application) written by a good Cobol programmer rather than by a weak PRG programmer.

Management wants a certain job done by its data processing (or any other) staff in the most professional manner at the lowest cost and in the quickest time possible. Failure to meet these requirements is a people problem, not a language problem.

If you have seen a weak RPG shop, blame the people, not the language. If you have seen (or have) a strong Cobol shop, credit the people, not the language.

Pritchard is data processing manager with Baker-Crow Co., Dallas.

Letters to the Editor

'Damn the Name... But Give Me the Shirts!'

Having read the many letters to the editor as well as Alan Taylor's article [CW, May 2] regarding what to do with Robert D'Unger's name, I have concluded that this issue has been whipped to death – or nearly so.

For most of my life I have experienced a similar problem, although I must admit it has become more prominent since the advent of data processing. In all fairness, however, the problem is not solely related to data processing.

Many clerks and a great many typists over the years have had difficulty with my name. The apostrophe is omitted, "B" is not capitalized, and I am sure you can imagine the variations in spelling.

Since data processing came into being, I have not had a single paycheck or computerized bill with my name correctly shown. Even stock certificates are wrong! However, none of this really disturbs me.

Nor am I disturbed when I call for my laundry and the clerk finally locates it in the "B's" instead of the "O's."

What this all amounts to is that I am not at all touchy about the spelling of my name. I have never had any trouble cashing a paycheck or stock certificate. I couldn't care less about where a data processing system files my name.

All I really want is for them to be able to locate my account when the need arises, and I want the laundry to "locate the damn shirts" when I call for them! Nothing else really matters.

Joe O'Bryant
Hartsdale, N.Y.

Sound Auditing Need Shown

Re: Equity Funding: the computer side of what happened appears to be emerging. Lacking was the independent ability to access, verify and confirm the validity of all records.

Hundreds of users of computer auditing systems that equip the auditor with an independent "telescope" into computer files will disagree with the auditors . . . "professing that it is virtually impossible . . . to detect the kind of fraud that appears . . . "

I believe the ratio of fraud to innocent mistakes will inherently be tiny. The deterrent effect of good computer auditing through the computer makes it even smaller.

General information to date indicates the Equity Funding situation, while perhaps ingenious in application, involved the computer in a fairly simple manner. If the computer people sensed something wrong, users of a sound auditing system should have and would have verified the computer files even earlier.

Jerome Priest
President
Computer Resources Corp.
Wilton, Conn.

Individual Determines

The dialogue on RPG reminds me of the Block/Head debates on the checkless cashless society (1966, 1967).

What is shown by this is that data processing is far from a science and that successful use of computers is an individual thing.

To this I add, management take note.

K.A. Kleinman
Systems Manager
Edison, N.J.

During
The June 6th **Show Issue** (B & W close May 25th.)
After
Our June 13th **Wrap-up Issue** (B & W close June 1st. Color Close May 25th)

Whether or not you're going to The National Computer Conference, *Computerworld's* last-minute, complete coverage of the new, consolidated show is must reading-including the latest information on the wide variety of new products which will be displayed. Only a weekly newspaper can give you such complete and up-to-date coverage. And *Computerworld* is the only newsweekly for the computer community.

NCC is not a protest group.
COMPUTERWORLD

The National Computer Conference: We've got it covered.

For details, contact the nearest Computerworld Representative:

Boston
Bob Ziegel
(617) 332-5606

New York
Don Fagan
(212) 594-5644

Los Angeles
Bob Byrne
(213) 477-4208

San Francisco
Bill Healey
(415) 362-8547

or write to: Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160

Read Journal of Development

Involve Users in Cobol Process? Educate Them First

By Fred L. Forman

Special to Computerworld

Viewpoint

Christopher Coddington's "Viewpoint" ["Contact Between PLC, User Lacking," CW, May 2] strikes me as a curious attempt to refute points in my previous "Viewpoint" ["Make Suggestions Direct to PLC," CW, April 11].

First, my motive was not to discredit Alan Taylor, but to discredit his "solution" to a problem.

I agree with Coddington that the problem is user involvement in Cobol development, and I do not believe that Taylor has proposed an acceptable solution. What is curious about Coddington's article is that he also fails to suggest a solution.

Taylor's solution to the problem of user involement is that users send proposals to the Cobol Coordinating Committee which will review, recommend, wait for response, then "take action" (whatever that means). Coddington seems to agree with me that such a committee could only delay the user from getting his requests acted upon by the Programming Language Committee (PLC).

Is 3C an effective mechanism for providing users with timely information about Cobol development? I think not.

I said in my article, and still believe, that Taylor's solution will only give users the opinion of a very narrow segment of the user society (the 3C Research Department).

Educate Users

To involve users in Cobol development, we must educate users to the development process, provide a mechanism for suggested development and report what development has taken place. PLC accomplishes the last two items, but has failed in the first – educating the user community.

My previous "Viewpoint" provided information to the user so he would know *how* to become involved. Alan Taylor is not serving the useful involvement of the user by setting up new committees and journals.

Neither has Coddington in any way contributed to the solution of user involvement with his article.

The best way for the user to become involved is to get a copy of the Codasyl *Cobol Journal of Development* (Publication 110-GP-1c) by sending $3.50 (payable to "Receiver General of Canada") to: Technical Services Branch, Department of Supply and Services, Fifth Floor, 88 Metcalfe St., Ottawa, Ontario, Canada, (K1A 0S5).

Suggested proposals, ideas and thoughts may then be made directly to PLC by sending them to: Chairman, PLC, Box 124, Monroeville, Pa. 15146.

On Representation

As a final observation, Coddington fails to note the concept of representation. PLC, Ansi and the other committees to which he refers are representative of the user. There is no practical way to have all the users participate in every decision.

Applied to government, industry, unions and nearly every other segment of our lives, the concept of representation works well, so long as the people who are represented are properly informed about decisions that have been made on their behalf and a mechanism for change exists.

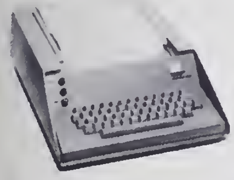
PLC informs the users it represents by making the JOD available to the public. PLC also provides a mechanism for change to the extent possible (yet still be able to accomplish useful work). The user is solicited when practical – for example, the public availability of the Data Base Language Task Group proposal, and inviting proposers to the meetings at which its proposal is considered.

Ansi and Ecma are also representations of the users but are non-PLC organizations. I'm not sure why Coddington calls them "affiliated." They are affiliated only in the sense that they also are interested in the Cobol language. They use the same channels which are available to anybody for submitting proposed changes to the language.

Neither Alan Taylor nor Christopher Coddington has solved the problem of user involvement in Cobol development. Nor have I fully solved the problem. I have, however, tried to provide the information which the user needs to become involved in Cobol development.

Forman currently represents American Management Systems, Inc. on the Programming Language Committee.

STILL WAITING?



WE'LL SHIP YOU A CDI TELETERM® IN 7 DAYS*

OR ELSE.

Get a CDI Model 1030 TELETERM portable time-sharing terminal by next week. Just send us a bona fide purchase order for $3,100. If we take longer than 7 days to get your TELETERM on its way, we'll give you a whole case of paper. Free.

The CDI 1030 is a lightweight, quiet, reliable terminal using a thermal printing technique. It operates at 10, 15 or 30-characters per second and is perfect for time-sharers on the go.

So don't just sit there and wait. See how fast you can get a TELETERM of your very own!

*A.R.O.

a TECHVEN corporate partner

COMPUTER DEVICES INC.
9 Ray Avenue
Burlington, Mass. 01803
(617) 273-1550

®Reg. U.S Pat Off.

If your company has an IBM 370 computer system on order or is considering ordering one in the near future, explore the leasing terms available from DPF.

Consider what DPF Inc.*, the largest independent System 360 computer lessor in the United States, can do for you:

Time-Tailored Leases. DPF offers both short-term (as short as three years) operating leases and long-term (as long as ten years) full-payout leases. We help you choose the term that best fits your requirements.

Flexibility. All DPF leases contain provisions which permit you to change your arrangement should your data processing requirements change at any time during the term of the lease.

Full Service. DPF doesn't forget you once your hardware is in place. From its vast resources and experience (almost a quarter of a billion dollars of 360 computer inventory presently installed) DPF provides you with continuing hardware and software support throughout the term of your lease.

Peripherals, Too. DPF leases cover your complete data processing system, including non-IBM peripherals you may select.

Competitive Costs. Compare the cost of leasing 370 equipment from DPF with any other figures you may have. You'll be delighted.

So, you see, the short-term operating lease did not die with the advent of the 370. It is alive and well at DPF. Why not get the full details by contacting Mike Swords, our National 370 Sales Manager at Hartsdale, or one of our five Regional Managers: Bill Drew, Chicago, (312) 297-4620; Mac McDaniel, Houston, (713) 783-5641; Harry Carr, Los Angeles, (213) 641-5370; Tony Pintauro, New York, (212) 688-7601; Bill McDermott, Washington, (202) 833-2065.

dpf

DPF INCORPORATED
141 Central Park Avenue South
Hartsdale, New York 10530
(914) 428-5000

*Formerly Data Processing Financial & General Corporation

When they say you can't get a 3-year operating lease on a 370,

tell them about DPF

Sell the United Kingdom this September

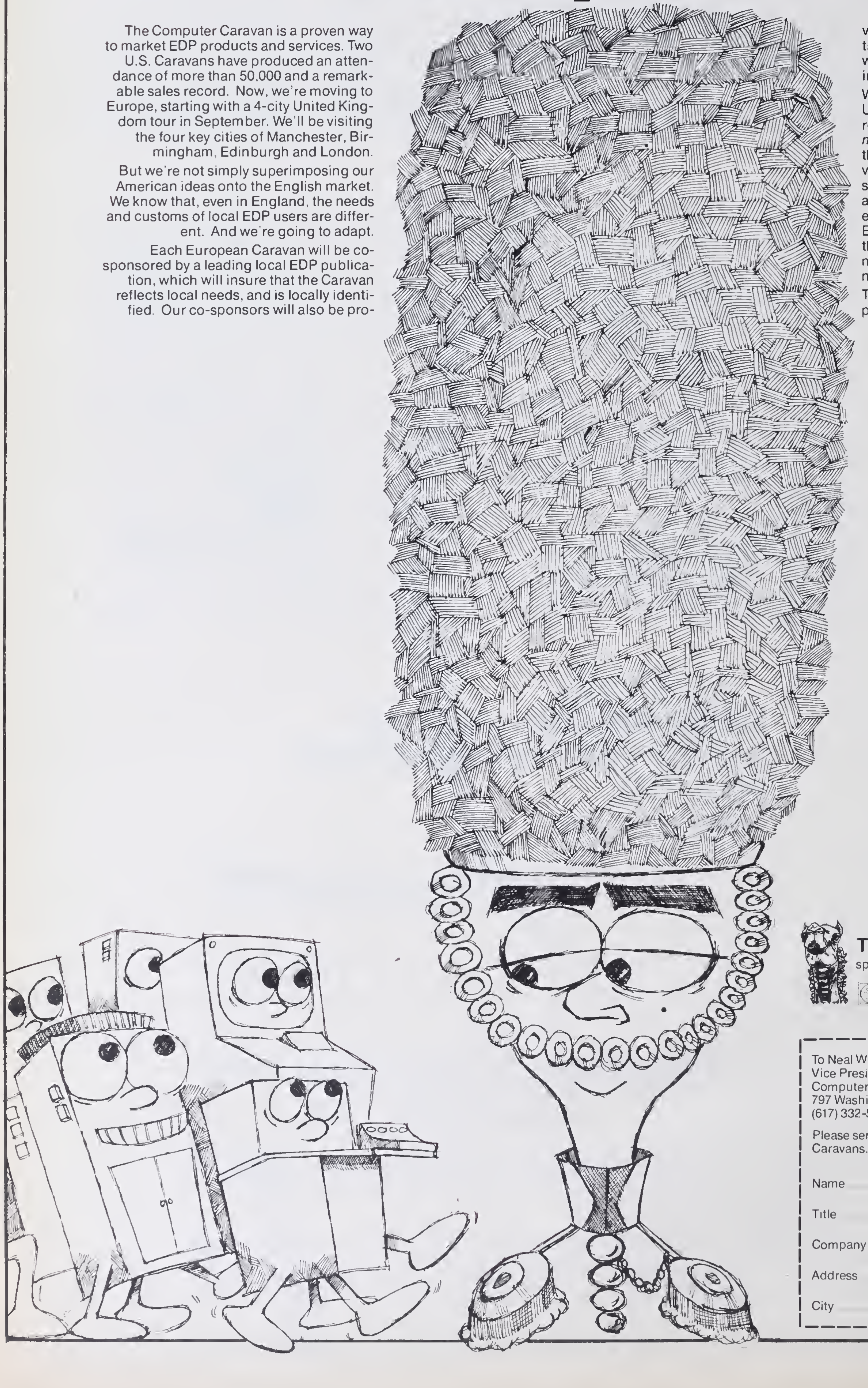
The Computer Caravan is a proven way to market EDP products and services. Two U.S. Caravans have produced an attendance of more than 50,000 and a remarkable sales record. Now, we're moving to Europe, starting with a 4-city United Kingdom tour in September. We'll be visiting the four key cities of Manchester, Birmingham, Edinburgh and London.

But we're not simply superimposing our American ideas onto the English market. We know that, even in England, the needs and customs of local EDP users are different. And we're going to adapt.

Each European Caravan will be co-sponsored by a leading local EDP publication, which will insure that the Caravan reflects local needs, and is locally identified. Our co-sponsors will also be providing significant local attendance promotion, so we'll have a locally oriented tour with good attendance by EDP buying influences.

We're proud that our co-sponsor for the United Kingdom tour will be the highly respected monthly, *Computer Management*, the recognized leader in its field in the United Kingdom. The best of the Caravan ideas combined with leading local support. It's a package tour that will attract thousands of EDP buying influences. And if you're interested in the European market, you should be there—in the United Kingdom in September, Germany in November and the French market next spring.

To get a free brochure, just send in the coupon. We'll send out the details right away.



The European Computer Caravans
sponsored by
COMPUTERWORLD

To Neal Wilder
Vice President
Computerworld
797 Washington Street, Newton, Mass. 02160
(617) 332-5606

Please send me further details on The European Computer Caravans.

Name ____________________

Title ____________________

Company ____________________

Address ____________________

City ____________ State ________ Zip ________

Random Notes

IMSL Releases Third Edition Of Mathematical Subroutines

HOUSTON – International Mathematical and Statistical Libraries, Inc. (IMSL) has announced the release of Edition 3 of its mathematical and statistical program library. This release, for IBM users, will be delivered to subscribers in July. Releases for other CPUs will be delivered later in the year.

The library includes subroutines and complete application programs written in Fortran and distributed in source code. A subscription price of $840/yr includes updates, a facility for requesting additional subroutines and telephone consultation on the use of the library. IMSL is at Suite 510, 6200 Hillcroft, 77036.

Andco 'Optima-Maxima' Service Provides Project Plan, Control

BUFFALO, N.Y. – Project managers can plan, control and later review operations through the Optima-Maxima service now available on a mail-in/carry-in basis from Andco, Inc.

The system generates a report on the various ways in which manpower and materials can be allocated to the project.

During construction, the service provides progress reports, showing actual vs. expected completion of the various tasks within the project. Finally, a summary of the project elements is generated to aid in future planning.

Andco declined to estimate the cost of using Optima-Maxima, since every project is made up of many variables. The company is at 51 Anderson Road, 14225.

Sisco Opens Remote Office

SAN FRANCISCO – A remote terminal facility at 215 Market St., opened recently by Singer Information Services Co. (Sisco), allows users to communicate directly with an IBM 370/155 in Sunnyvale, through Singer System Ten CPUs. Wylbur interactive terminals are also available, a Sisco source added.

A full range of applications has already been installed on the IBM mainframe but the system also allows users to develop their own programs in any of the languages supported by the 370. Sisco expects to open other remote facilities, in Los Angeles and other cities, the spokesman said from 1105 Kern Ave., in Sunnyvale, Calif., 94086.

Correction

The Naval Air Development Center at Warminister, Pa., is refusing all requests for copies of a CDC-6600-oriented General Purpose Simulation Program (GPSS) [CW, March 7]. The program was created for the center's use, a spokesman explained, and there are no current plans for public distribution of the software.

Saves Time, Forms Costs

'Recoop' Lists Reports and Recipients

By Don Leavitt
Of the CW Staff

BEVERLY HILLS, Calif. – The Report Control Optimizer (Recoop) program, just introduced by International Management Systems, provides management with a means of identifying obsolete, unnecessary and unwanted reports. From 5% to 20% of all reports may fall in one or more of those categories, the company said.

Though intended as a tool to review existing practices, Recoop may also prove useful in answering requests for apparently new reports that may already be in production, but not being delivered to the current requestor, perhaps through an oversight. Or it could be used to identify a current report that needs only slight modification to fit a new and broader requirement.

Hidden Benefits

Controlling report distribution may save computer and staff time, but its most important benefit might well be in the area of eliminating high cost multiple-ply or specially printed forms. More abstractly, the Recoop lists may provide the end-user departments with a clear indication of the DP staff's continuing interest in their problems.

Operated in batch mode on any 360/370 with a 55K-byte partition, two tape drives and a 2314 or better disk, Recoop includes two basic data files. One carries complete narrative and statistical descriptions (including identifying code numbers) of all reports to be controlled by the system. The other file contains detailed information about the recipients of the reports.

The distribution definition file shows who gets each report, how many copies and both where and how they are sent to the recipient. Summary information includes the total number of copies of each report and the total or average number of pages produced. This data allows analysis, at the management level, of who is using each report and why, and whether the distribution pattern is as effective as it might be.

Report Checklist

Another Recoop printout provides the DP operations staff with a hard-copy checklist of what reports should be generated by the various applications and to whom they should be sent.

Alternatively, each apparent recipient can receive a list of the reports he should be getting, together with a description of what each is supposed to cover.

Up-to-date maintenance of the Recoop files is critical to the effectiveness of the system, and probably should be an assigned duty of a specific member of the DP operations staff, one who has to coordinate his efforts with the systems group and the end users, the vendor suggested.

Recoop is written in ANS Cobol, but only object code is distributed. The program runs under either DOS or OS environments, and is available for a one-time charge of $5,200.

International Management Systems is at 9665 Wilshire Blvd., 90212.

'Bars' Puts Boolean Retrievals On HP 2000 Systems, Leasco Net

HONOLULU – Users of Hewlett-Packard 2000 Series time-sharing systems and subscribers to Leasco Response I service can perform on-line retrievals of items from data bases through the Boolean Attribute Based Retrieval System (Bars) from Real-Share, Inc.

Search key parameters under Bars are built under desired field descriptors and Boolean connections (AND, OR) and negative variants of those connectors. The descriptive terms are stored in a keyword dictionary with a potential capacity, according to Real-Share, of "several hundred thousand terms."

Through ANDing and ORing of the terms, Bars searches are tailored to provide very precise retrievals. But the system recognizes that initial search definitions may be too general to be effective, so it reacts first by searching the file for matching items, reporting the number of "hits" to the user, and asking if the request is to be modified.

Once the user is satisfied with the form of his request, he may ask for a display of the items retrieved. These displays may be formatted in various user-defined reports, from brief listings of relevant information from each of the items, to complete printouts of specific records.

Once the items to be retrieved have been identified, the user may invoke a sort routine to display all or a selected subset of the pertinent items in a particular sequence, perhaps based on a keyword that is irrelevant to the normal file sequence in which the record is stored.

Items can be stored under Bars in a variety of forms ranging from seven to 1,750 characters each. Items can be added, changed or deleted through file maintenance transactions. New items are associated with keyword dictionary terms either by the user, or by the system itself when context indicates the relationship.

Bars is written in Basic and programs range from 10K to 11K words of memory depending on the computer being used.

The package can be purchased for $19,000 or leased for $790/mo (for two years) or $645/mo (for three years). The Leasco Response 1 version is available through arrangements with vendors of that service.

Real-Share is at P.O. Box 275, 96809.

Time-for-Sale Now Includes 370s

ELMSFORD, N.Y. – Computer time-for-sale now includes a growing number of 370 installations throughout the country. This in turn has made many 360 time sellers more competitive, but by providing improved service rather than through price cutting, according to Time Brokers, Inc. (TBI).

Time on 370/135 has become "much more plentiful" during the past several months, the firm said, and 145 time has been available for over a year in good quantity in all sections of the country. Outside 155 and 165 time is utilized on a regular basis by many large shops, TBI's latest report noted.

Demand for 360/30 65K time remains good in most areas, and this configuration "far outsells" 32K offerings. Requests for Model 40 time are also holding steady, but demand for time on 50s and 65s fluctuates, based both on competing 370 time available and the spasmodic usage requirements of some big system customers, the firm continued.

Traditionally, outside time-for-sale has been used by installations that are unable, for several reasons, to use their own equipment. Program development before in-house equipment is installed is one classic reason; periodic special jobs too large for the user's own gear or reporting period workloads too large for the equipment has tended to be the other major "excuse" for going "outside."

But TBI reported that a great deal of emphasis is being placed on long-term production contracts. Testing for new projects "always continues," the firm noted, but many users now prefer to purchase computer time for production, while utilizing their own computer to test new work.

Peripherals and add-ons from both mainframes vendors and independents has made the time-for-sale market complicated for both the buyer and seller of time.

TBI has prepared a free *Uniform Code for Computer Time Marketing* which is available from 500 Executive Blvd., 10523.

'An Operator Mounted The...WRONG TAPE'

The lost time may never show up – but it cost real dollar$

Every day, in thousands of data centers throughout the country, this same scene is repeated. It can be prevented. Value Computing has developed a new and different approach to Tape Library Control. The VALU-LIB system will tell your tape librarian which tapes to withdraw to get the best multiprogramming schedule, and then generate the labels, if you'd like!

OS/DOS, standard, non-standard and unlabelled tapes – they're all the same to VALU-LIB.

- Comprehensive Management Reporting
- Extensive Quality Control Aids
- Emulation & Second Generation
- Automatic Feedback via SMF
- Data Set Name Tracing
- Rerun Backup Information
- Auditing
- Automatic Retention
- Read/Write Error History
- Disk Data Base

VALU-LIB integrates with the other Value Computing products, to provide a total system.

$4,000 DOS version $6,000 OS version

value computing inc. 496 Kings Highway North, Cherry Hill, N.J. 08034 (609) 667-8770

value computing inc.
496 Kings Highway North
Cherry Hill, New Jersey 08034

GENTLEMEN:
PLEASE SEND INFORMATION ABOUT
☐ ☐ VALU-LIB TAPE LIBRARY
☐ CALL ME FOR AN APPOINTMENT

NAME____________TITLE____________
COMPANY________________________
ADDRESS________________________
CITY________STATE________ZIP________
TELEPHONE________________________

'How Much Should I Buy?'

BLUE BELL, Pa. – Developed originally for the distribution industry, the Optimum software package, just introduced by Univac, enables purchasing agents to determine the "correct" quantity of an item to buy ahead of announced or anticipated price increases. It can be used on-line or in batch mode.

The system logic considers all factors, including cost of capital and storage as well as the actual cost of the items being bought. It calculates and then displays, on a CRT terminal or printer, the "buy-in" quantity that would maximize savings compared with paying a higher price later.

Savings to be realized from the proposed purchase are expressed in dollars and cents and as a percent of annual costs or other expenses. If the purchasing agent rejects the original recommendation, Optimum provides alternate analyses of other quantities with corresponding changes in the savings to be realized.

With this ability to check out different solutions to a given problem, Optimum gives the purchasing agent working on-line the same sort of "what if" options that modeling systems provide the financial analyst.

The system can be used, for example, to try to anticipate what should be done in case a critical item goes up in cost, even though no specific increase has been announced.

Optimum can be installed on "any" Univac system that supports a Fortran IV compiler, including the upper end of the 9000 Series as well as the 1100s. The software is free to Univac users.

'Regular' RPG Programs With BAL Help Keep 370 Moving at Stackpole Carbon

ST. MARYS, Pa. – Stackpole Carbon Co. has replaced its 360/30 with a 370/135 and is beginning to get into telecommunications to tie its six plants together, but DP director Dave Doyle has no plans to replace RPG with RPG II or any other language as his principal programming tool.

The company has a wide range of conventional, accounting-oriented applications all originally coded in RPG, but it utilizes BAL, Fortran or Cobol subroutines when they seem necessary. Sometimes regular RPG just isn't powerful enough, Doyle admitted.

No Need to Switch

"We've looked at RPG II and are convinced it is much better [than RPG], but we really don't see any justification in it for us," he added. His installation is running 18 hours a day, five days a week, but the company owns the hardware so there is no real dollar saving to be gained by cutting computer time through RPG II, according to Doyle.

Run-time savings would be absorbed by staff time spent in whatever modifications are needed to go to RPG II, and by the ongoing cost of the more modern language system, which is an IBM program product. "Regular" RPG was released prior to IBM's unbundling of software in 1969 and therefore is free.

'Heaven on Earth'

Doyle's staff backs his continued use of RPG.

"If one has a good command of the RPG language and realizes the extra power it can have by combining it with BAL when needed, he can have the best of both worlds – [programs] that are easy to write and . . . capable of almost any application," according to John Mastrogiacomo, one of eight systems/programmers at Stackpole.

The staff has developed its own "package" of BAL subroutines to handle programming chores such as console input control, bit checking and physical disk reading, which can't be easily done directly in RPG, he added.

He feels sure that writing and debugging a program are quicker, and execution is slower with RPG than with Cobol or BAL, but neither he nor Doyle has run benchmarks to prove these points.

As satisfied as the staff may be with the RPG capabilities, however, it is willing to consider commercial packages when they seem worthwhile.

In planning for telecommunications within its local complex and with its outside plants, Stackpole looked first at IBM's Customer Information Control System (CICS) but rejected it in favor of a TP monitor system from Westinghouse Tele-Computer Systems Corp.

The local version of the monitor is currently being tested and installed. The remote version, expected to tie into plants in Virginia and North Carolina first, is still under development, a Westinghouse source indicated. Stackpole will be using IBM 2780 and 3735 terminals, Doyle noted.

'In-Form Gives 804 Remote Capabilities

NASHUA, N.H. – Sanders 804 terminal users can capture data locally, perform extensive editing of the data and support remote communications to an IBM 360/370 mainframe by utilizing the In-Form software from Sanders Data Systems, Inc.

In-Form's logic permits setting up record formats, including both fixed and variable data, and storing these formats on one of the tape units within a cassette that is part of the terminal. The formats are described in English-like terms, including names for the fields, acceptable lengths and appropriate data types.

Editing on the 804 under In-Form checks input data against the specified stored formats before putting the record on the second tape unit on the cassette drive. In-Form includes the ability to store a partially completed record, then recall it to fill in data that had been unavailable when the original entry was made.

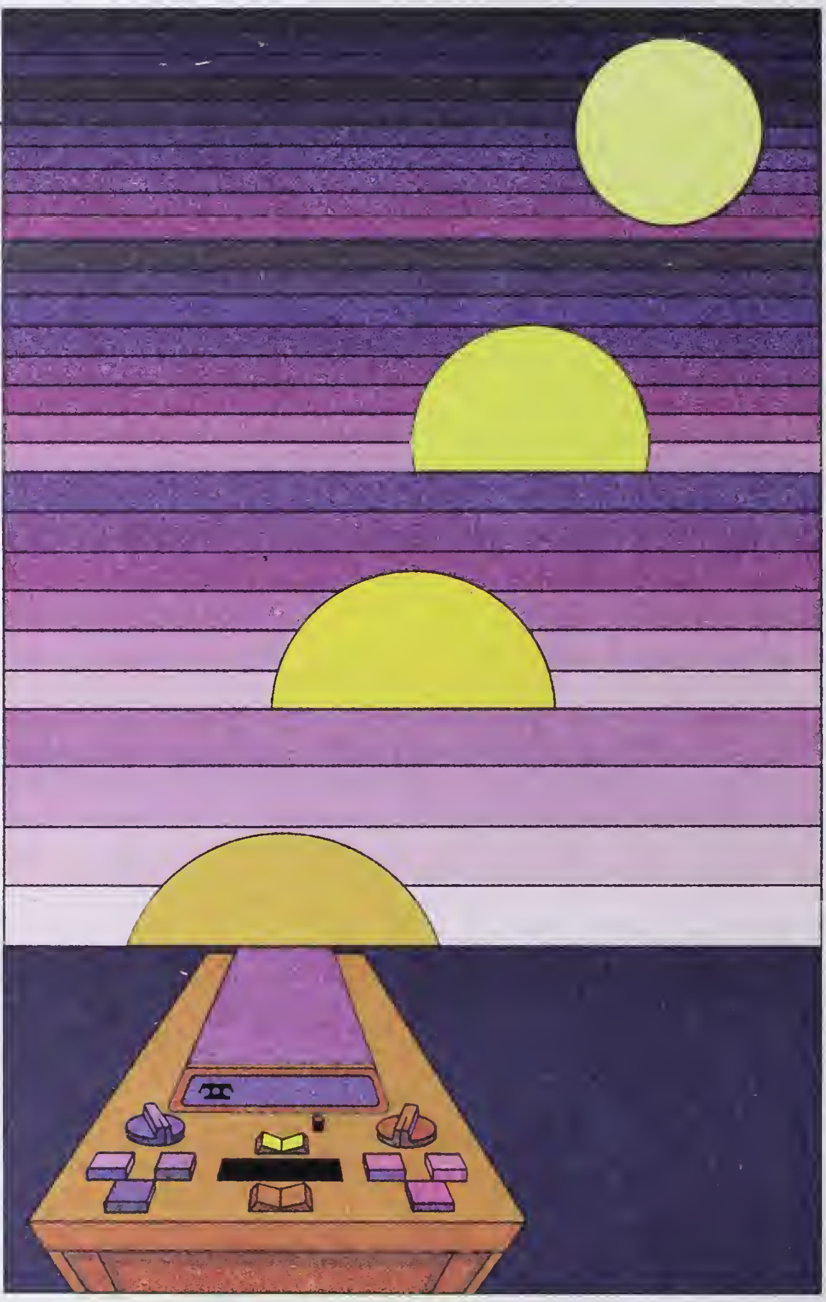
Remote batch communications support under In-Form transmits the collected data to a remote 360 or 370 and receives data and reports from the mainframe, storing the new input on cassette or putting it out on the terminal's printer. Both transmission and receipt of data, including the printing, can be done in unattended mode, Sanders noted.

In-Form uses the same line discipline as the IBM 2780 Remote Job Entry terminal, which makes it compatible with Btam-, Qtam- or Tcam-based applications programs within the 360 or 370.

In-Form software is distributed free to users of the Sanders 804, which can be leased for $401- to $478/mo (depending on the lease agreement), or purchased for $12,780.

Sanders Data Systems is on Daniel Webster Hwy. South, 03060.

The 4210.
We call it our "moonlighter."



Teletype is a trademark registered in the United States Patent Office

Because after you work our 4210 magnetic tape data terminal all day, it's ready to work all night.

For example, with the 4210 set in the local receive mode, your operator can prepare tapes during the day simply by typing them out on a standard keyboard terminal—like a Teletype® model 33, 35, 37 or 38. Then at the end of the day, the operator switches the 4210 to the on-line automatic mode. So data goes out at night when transmission rates are lower or unused capacity is available. At up to 2400 baud for efficient utilization of voice grade channels.

Not only does the 4210 send out previously prepared tapes while everyone is at home relaxing, the unit also receives new data. And if time is critical, the automatic rewind and local print-out option allows data to be recorded and printed out.

Completely unattended.

So when everyone shows up in the morning, the data received during the night is there, waiting. And the machine is ready to start its daytime job as a data preparation terminal.

It takes more than manufacturing facilities to build this kind of versatility into the machines Teletype Corporation offers. It also takes commitment. From people who think service is as important as sales. In terminals for message communications and computers.

That's why we invented a new name for who we are and what we make. The computercations people.

TELETYPE ®
The computercations people.

For more information about any Teletype product, write or call: TERMINAL CENTRAL, Teletype Corporation, Dept. 32Q, 5555 Touhy Avenue, Skokie, Illinois 60076. Phone 312/982-2500.

Data Briefs

RCA Teleprinters, Modems Connect to WU TWX Net

CHERRY HILL, N.J. – RCA has a variety of leased Teletype teleprinters and modems for connection into the Western Union TWX network.

Under Western Union's interconnection policy, users of the company's teleprinter, Telex and TWX exchange services may own, rent or lease their own terminal equipment.

RCA will be leasing Models 3 and 35 ASR or KSR equipment.

Prices for the ASR Teletype equipment will start at $77/mo, the KSR at $63/mo. Delivery is within three weeks after receipt of an order. The lease/service contracts are offered on a 30-day cancellation basis.

RCA will also lease Model 32 ASR and Model 28 ASR or KSR terminal equipment to Telex subscribers starting early this summer.

RCA Service Co. is at Bldg. 204-2, 08101.

Terminal Replaces IBM 2741

SUNNYVALE, Calif. – Trendata is offering its Model 900 desk-top conversational terminal to work as a replacement for the IBM 2741 terminal and as a standard Selectric typewriter when not in the terminal mode.

The Model 900 consists of a heavy-duty IBM Selectric connected by cable to a small electronics/modem package that the manufacturer said can be located adjacent to the desk area.

Leased price of the Model 900 will be $90/mo on a one-year lease, including maintenance. Purchase price is $3,750.

Delivery will be in 30 to 60 days from 610 Palomar, 94086.

Bendix Shows Portable CRT

SOUTHFIELD, Mich. – Bendix Interactive Terminals Corp. has introduced a portable CRT computer terminal.

The Logiport 2 terminal has a 16-line display with 80 char./line and a non-glare, 5 in. by 7 in. screen.

Standard features include teletypewriter compatibility, roll or page mode, full- and half-duplex operation and automatic key repeat.

The Logiport 2 costs $2,450 from Bendix Center, 48076.

Terminal Contains Card Reader

NEW YORK – Panasonic has a data entry terminal that contains an optical card reader to read punched cards or badges.

The unit reads the data on the card or badge when it is inserted into the terminal and transmits the data serially along with variable data and simi-fixed data entered through optional numeric keyboard and thumbwheel switches.

Price starts at $1,800. Delivery begins at the end of June from Matsushita Electric Corp. of America, 200 Park Ave., 10017.

Reservation Data Base

370 Net Handles Hilton Room Status

By Ronald A. Frank
Of the CW Staff

DALLAS – If you wanted to keep track of all Hilton Hotel room reservations, you would probably have two 370/145s handling a national communications net.

And that is exactly how Compass Computer Services handles the Hilton reservation system. The company uses the dual 145s to house a data base containing the room status for both U.S. and domestic hotels in the Hilton organization.

The 370s are interfaced with two CDC 1700 CPUs. The 1700s poll a network of 300 CRTs operating on private lines with another 70 displays connected to the Dallas DP center through dial-up facilities.

Built-In Modems

The terminals, supplied by Terminal Communications, Inc., have built-in Bell 202-type modems, according to Norman Crane, communications manager at Compass, and transmit at 1,800 bit/sec on the private-line facilities and 1,200 bit/sec on dial-up lines.

In addition to the modems there is a printer to allow each remote site to get the latest room reservation information from the Dallas center. The private-line system uses 11 C-2 conditioned 3002-type lines from Bell.

Each remote terminal is polled for 18 hr/day, at 10-second intervals, by one of the 1700 front ends. The data is transmitted to the 1700 in Ascii, and transferred to the on-line 145 through a special CDC data communications channel interface.

The interface box is connected directly to the selector channel on the 145. The special CDC software makes the 1700s simulate a tape subsystem to the mainframes. There are two complete systems for redundancy, and each 1700 can interface with both 145s.

The data transferred by the CDC channel interface is converted from Ascii to Ebcdic inside the mainframe, processed and then reconverted into Ascii before it is sent back to the 1700, according to Al Gallardo, senior programmer/analyst at Compass.

Each Hilton Hotel and reservation center has a terminal and the system continues to expand, according to Crane. For the future he is considering the addition of remote multiplexer/concentrators to batch the inputs from several remote sites. But the concentrators will not be added until an extensive equipment evaluation is done.

At present, the nationwide network uses telephone company lines but Crane will consider the specialized carriers when their services become available.

The room reservation data base uses independent applications software from Unicorn Systems Co. The software is housed in the 384K of storage included with each of the 145s.

Although the exact traffic on the system varies according to the time of day in each time zone, the daily rate is high. On a typical West Coast private line with 25 CRTs, about 7,000 transaction/day are handled, Crane said.

In addition to booking new reservations, the network supplies a list of expected guests to each hotel when the terminals come on-line in the early morning.

In addition to the domestic communications system, Compass handles telegraph traffic from international hotels in the Hilton chain. These messages are transmitted through the TWA telegraph network and Compass maintains a link to the TWA system in Kansas City.

The international room information is handled manually and converted for entry into the 370 data base.

Store Checkout Systems Perform At Supermarket Institute Show

DALLAS – Several store checkout terminal systems were introduced here recently as part of the Supermarket Institute convention. Litton Industries, Bunker Ramo and Electronic Laboratories announced systems designed to interface with a CPU in the store environment.

Litton, New York City, showed its Superegister which can be adapted into a minicomputer-based system using scanners for the Universal Product Code (UPC). The terminal can accumulate totals for 12 store departments, separate taxable from non-taxable items, calculate taxes and perform other checkout functions.

Each terminal includes a read only and random access LSI memory. About 10K bytes of ROM and 512 bytes of read/write storage are included in each checkout unit to perform all required calculations.

The terminals can be interfaced with minicomputers for "back room analysis," a spokesman said.

The terminal will cost about $3,000 to $3,500.

Bunker Ramo, Oak Brook, Ill., introduced an enhanced version of the store terminal system developed by Nuclear Data for Star Markets. The expanded electronic store information system (Esis) includes a dot matrix printer with larger type and an electronic scale interface. The terminals also can operate off-line if the Esis CPU malfunctions. A 10-terminal Esis system will cost about $42,000, a spokesman said.

A portable system was shown by Electronic Laboratories, Inc. for "business information collection." The System 900 includes a hand-held calculator-type key entry unit which records data onto a battery-powered cassette. The complete system including a transmitter console to send the batched data to a remote site costs about $1,800.

The cassette information can be transmitted directly to an IBM 2701 line controller or the system can operate online with an IBM 360/370 multiplexer channel. Input can also be sent to a System/3 or System/7 processor.

A receiver converter unit can poll remote sites with batched data onto the cassette storage. The full polling system will cost about $15,000, a spokesman said. The company is at 3661 Yellow Creek Road, Akron, Ohio 44313.

Terminal Takes Charge Over Card

CLEVELAND – A point-of-transaction terminal that can validate credit cards by reading either embossed character or magnetic stripe coded information is available from Addressograph Multigraph Corp.

The Amcat-1 terminal can accept data from a credit card or keyboard. The key-entered data detailing the current transaction is displayed for verification by the operator.

The Amcat-1 includes a 128-character message buffer which stores all pertinent transaction information. The data can be transmitted over lines operating in private-line polled networks.

The terminal includes an imprinting option that can print and scan OCR 7B font characters. The terminal can transmit data at 300 bit/sec in Ascii format, using a communications module.

The Amcat-1 can be configured as part of a terminal management system that includes a message concentrator with a built-in minicomputer. This configuration includes the necessary software to poll remote terminals and performs line control functions.

The concentrator with modems, cassette storage unit, TTY and software costs about $90,000 without terminals, a spokesman estimated.

The mag stripe reading conforms to American Bankers Association standards while the embossed reading follows the current Ansi numeric standards. The basic system cost $1,250 from 20600 Chagrin Boulevard, 44122.

World's First 1200 Baud
Full Duplex
Two Wire Modem

vadic

505 East Middlefield Road,
Mountain View, Calif. 94040
(415) 965-1620
TWX 910-379-6567

Dear Ma:
Remember when you took me to see the magician that sawed the lady in half?
Vadic has just done the same thing to line costs!

Believe it or not, they have a modem capable of full duplex data transmission at 1200 bits per second over dial-up or two-wire leased lines.

Think of the impact this will have on users of CRT's, cassettes, and all sorts of buffered terminals who have been forced to piddle along at 300 bits per second or live with half duplex 1200 bits per second operation.

This modem is really something, Ma. It provides four times the data rate of your 103 while maintaining the same line discipline for connect, hand shaking, and disconnect. Imagine eliminating the complicated and inefficient half duplex mess forever. The zero turn around delay will save bundles on line costs.

I hate to tell you, Ma, but the VA3400 can be used in Vadic's Multiple Data Set or standalone units which have analog and digital loopback, display of all EIA interface signals, built-in 300 and 1200 baud test signals. It can also be used with any of Vadic's automatic dialers.

The price? Better sit down, Ma. Just $750, with OEM discounts available.
Delivery is 60 days ARO. Better phone your order in soon.

Your independent thinking son,
Alexander Graham Jr.

P.S. Who's Vadic? They've delivered over 20,000 modems to date.

VADIC: Bell & IBM type modem modules, modem modules on PC boards,
16 channel multiple data set systems, 4 channel stand-alone data set,
1 & 2 channel stand-alones, analytic test panels, modem/dialer combinations.

MOUNTAIN VIEW, CA 94040
-PM
2 JAN
1973

Ma Bell
195 Broadway
New York, NY 10007

People who really know computer tape know BASF Endura.

Airlines people. University professors. Insurance people. Engineers. International bankers. They're all buying BASF/Endura computer tape.

Frankly this new product has gained incredible acceptance.

We knew the world was ready for a tape that could meet future 3200/6400FCI expectations as well as today's…and Endura's success has proved we were right.

Of course everybody has their own reasons for buying Endura. Some like its durability. Others find it puts less wear and tear on their tape heads. Others are impressed with Endura's remarkably error-free performance—especially when they see the long term price savings.

All over the country, Endura's gaining acceptance with people who really *know* computer technology.

If you haven't already tried it, your BASF representative can give you some good reasons why you should. Talk to him. And get all the facts on our full line of magnetic media products.

BASF SYSTEMS
Division of BASF Wyandotte Corporation
Crosby Dr, Bedford, MA 01730.

BASF

BASF for people who really know.

Remote Batch Terminal Configurations Interact With 360/370 Mainframe Sites

Two remote batch terminal configurations that can interact with IBM 360/370 mainframe systems have been introduced recently by Keane Associates and Digital Equipment Corp.

Keane Associates, Wellesley Hills, Mass., has a remote batch terminal that emulates IBM 2780-type terminals.

Called the System/4 RBT, the unit can handle binary synchronous transmissions up to 9,600 bit/sec between remote locations and sites with 360/370 CPUs. The terminal is also compatible with the firm's System/4 processor.

A typical remote batch configuration using a 4K System/4 CPU, with dual tape cartridges, CRT display, card reader and line printer costs $15,420 or $335/mo.

The terminal can support BTAM, TCAM, CICS, Hasp and other IBM software. In an on-line mode, the input from magnetic tape or the card reader is transmitted at 2,000 bit/sec using Bell 201-type data sets. In the receive mode, the terminal formats records for on-line printing or translation to tape.

Off-Line Use

As an off-line system, the terminal can be used for data entry, tape editing and other functions which batch input data for later transmission.

Options include automatic line turnaround, auto answerback and vertical format control on the printer. First deliveries are scheduled in May 1973 from 39 Washington St., 02181.

DEC, Maynard, Mass., has introduced a remote job entry system using a PDP-8/E designed for educational applications.

Called the Edu-Batch terminal system, it includes a binary software emulator modem interface, teletypewriter and card reader. The system can access 360/370 mainframes and can be used in such applications as the instruction of business data processing administrative jobs at schools and colleges.

The terminal system can operate over private and dial-up lines at speeds up to 4,800 bit/sec. Peripheral devices supported by the mini-based terminal include a card reader, paper tape reader/punch and either a dot matrix or line printer. The basic system costs about $15,020.

Intertel Modems 202C-Compatible

BURLINGTON, Mass. – Intertel, Inc. has introduced two integral modems which are Bell 202C-compatible and capable of up to 1,200 baud over dial-up telephone lines.

The Model 2020 is Bell 202C5-compatible, while the Model 2021, which includes a 5 baud reverse channel, is Bell 202C6-compatible.

Both models include answerback tone generation, automatic answering, Mark hold on forward channel receive data when carrier is lost, receiver squelch and soft carrier turn off.

The two models operate via a CBS Data Access Arrangement following typical Bell 202C call establishment procedures.

The Model 2020 is priced at $330 in small quantities, the Model 2021 at $440. Volume deliveries are now being made from 6 Vine Brook Park, 01803.

Documation Has Interface

MELBOURNE, Fla. – Documation Inc. has introduced its CC-2400 communications interface for serial transmissions.

The unit provides six switch-selectable data rates from 110 to 2,400 bit/sec.

The CC-2400 costs $1,050. First deliveries will be in July from P.O. Box 1240, 32901.

Why buy RBT hardware by the ton when you can buy it by the pound.

Time was when the only source for Remote Batch Terminals was the giant companies...who offered fantastic capabilities...at astronomical prices. Whether you needed it or not. Then along came SCS Remcom with the first and only equipment designed specifically for RBT operation. Compatible with all kinds of computing equipment. With no unnecessary auxiliary equipment. Installed and working for $625 per month, including maintenance.

But the appeal of Remcom RBT's is as much in their flexibility as in their economy. As volume requirements increase, you can convert to faster or more flexible terminals at moderate cost. So you buy only as much system as you need...when you need it.

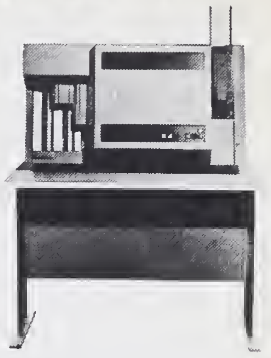
SCS Remcom now offers four basic RBT models with many possible configurations. Even an intelligent, programmable RBT system.

Our customers include American Telephone & Telegraph, Ford, Texaco, Dow Chemical, Aetna Insurance, Federal Aviation Agency, Arizona Highway Dept., Manitoba Provincial Government, and many others.

So when you shop for RBT's, weigh the alternatives carefully. By most any measure, the scales tip in favor of SCS Remcom.

SCS CORPORATION
REMCOM 2705 National Dr., Garland, Texas 75041 214 328-9991

KNOCKOUT PUNCH.

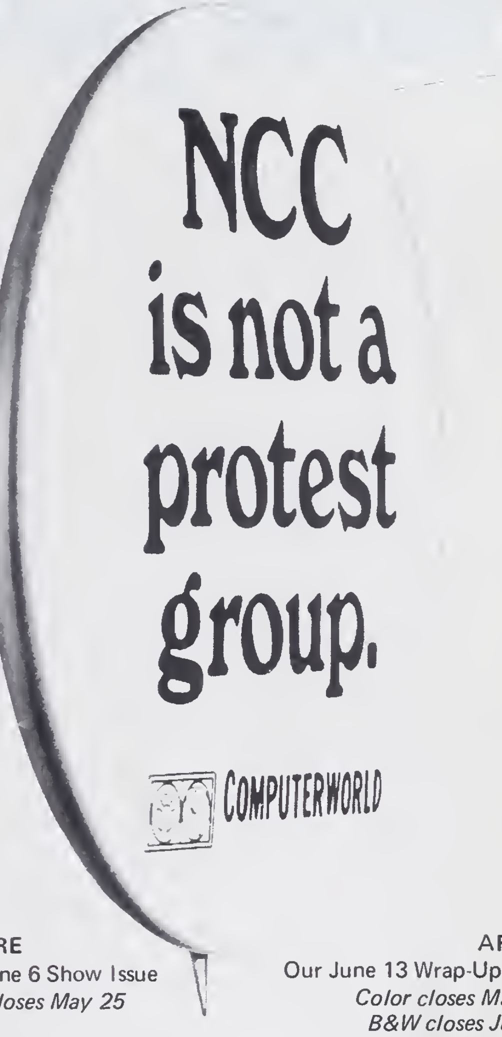


Our 9640 printing punch is really a "knockout"; it's fast, versatile and fully buffered too. Not only can the 9640 punch and/or print 96 column cards at 120-240 cpm, but it can also be equipped with an optional 1000 cpm pre-punch read feature!

And the 9640 can be combined with any of our eight other 96 column punched card peripherals to provide full I/O flexibility and growth for progressive OEM's. If you want to build systems that'll K.O. your competition, contact Decision Data – the world's largest independent supplier of 96 column card equipment.

THE 9640: Another SuperMachine from Decision Data.

DECISION DATA®
COMPUTER CORPORATION
100 WITMER ROAD, HORSHAM, PENNA 19044
(215)674-3300 TELEX 83-1471



BEFORE
Our June 6 Show Issue
B&W closes May 25

AFTER
Our June 13 Wrap-Up Issue
Color closes May 25
B&W closes June 1

Whether or not you're going to the National Computer Conference, *Computerworld's* last-minute, complete coverage of the new, consolidated show is must reading – including the latest information on the wide variety of new products which will be displayed. Only a weekly newspaper can give you such complete and up-to-date coverage. And *Computerworld* is the only newsweekly for the computer community.

The National Computer Conference: We've got it covered.

For details, contact the nearest Computerworld Representative:

Boston
Bob Ziegel
(617) 332-5606

New York
Don Fagan
(212) 594-5644

Los Angeles
Bob Byrne
(213) 477-4208

San Francisco
Bill Healey
(415) 362-8547

or write to: Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160

Honeywell announces
the start of something big:

A new, easy-to-use, low-cost model of our most powerful computer.

A brand new computer—Model 6025—with all of the features that have made our Series 6000 line one of the most successful in Honeywell history:

Multi-dimensional processing—Honeywell's renowned GCOS Executive System gives Series 6000 the ability to perform batch processing, remote job entry, time-sharing, message switching and transaction processing all at the same time, and still give you constant access to a common data base.

Powerful network processing—Advanced communication capabilities, such as the front-end processor concepts pioneered by Honeywell, let you put the farthest-flung action centers of your business in direct contact with your central computer. You have tight control over key data. You eliminate the need for costly multiple installations.

Easy on the budget—New technology: MOS microcircuitry, high density packaging, integrated peripheral controls, and new design concepts have helped us lower the entry-level price of large-scale computing.

Ease of use—Series 6000 GCOS software makes your computer system easy to program, easy to operate, easy to maintain. Advanced data base techniques make your mainstream data easy to structure, easy to update, and easy to get at when you need it.

Easy to convert—You don't have to be a Honeywell user to take advantage of all Series 6000 has to offer. With Honeywell's special conversion packages, you can make an easy transition to the 6025. Honeywell can be an attractive alternative to your present supplier.

Ease of growth—You can start with a small, low-cost Model 6025. Then add memory, add peripherals, add terminals, add applications, move up to a larger, more powerful processor. Series 6000 provides a virtually unlimited growth path without need to reprogram or convert to a new operating system. Your future needs are under your tight control.

Start something big in your company. Call your nearest Honeywell office. Or write Honeywell Information Systems (MS 061), 200 Smith Street, Waltham, Mass. 02154.

The Other Computer Company:

Honeywell

A Forum and a Means to 'Integrate'

Group Offers Seminars, 'Equal Rights' for Users

By Michael Weinstein
Of the CW Staff

NEW YORK – When President Nixon speaks of the forgotten Middle American, what he is really referring to is the System/3 user, Al Del Gardo, DP director of Excell Plastics, believes.

To correct this situation and bring S/3 users into the mainstream of the computer community, Del Gardo and other New York area S/3 users believe their organization, Guidance International, will fill the bill.

Presently, Guidance has about 150 members who participate in monthly meetings and periodic seminars.

The purpose of the meetings is to provide a forum for the users to communicate their experience and listen to guest speakers, Del Gardo noted.

For example, at a recent meeting Walter Carlson, president of the Association for Computing Machinery, spoke about profitability of the S/3. At another meeting Dr. Herman Limberg of the New York City Department of Administration spoke on handling data base applications.

A seminar last year featured an IBMer who over six sessions helped educate Guidance members on RPG II. Specifically, he addressed how to make changes in the programs from the console.

The Small Systems User

"A similar course might cost attendees about $300 if they attended an IBM school," Del Gardo estimated, "but for our members the cost was only $5 a session or a total of $30 for the entire course."

Guidance International was formed in 1966 and originally was designed for IBM 360 users. In 1968 it was incorporated in the State of New York as a non-profit organization and started directing efforts partially toward the S/3 user.

Indifference Noted

"A problem we found in our initial attempt was the indifference of the large association such as the DPMA to give the small user equal representation.

"Sure, they were willing to accept our dues, but there was not a great deal of effort by the larger societies to offer us any services," Del Gardo said.

"To some extent, the individual S/3 user was responsible for this as he seemed afraid and in awe of the large and sophisticated users at shows and national seminars.

"Somehow the S/3 user came to the notion that he did not belong, and partly for this reason very little effort has been made to integrate him."

But this is changing, according to Del Gardo. Just recently Guidance received a promise from the Data Processing Management Association for proportional representation on panels for the S/3 user.

At the same time American Management Research is starting to formulate seminar programs that will specifically be directed to the S/3 user.

Guidance is planning to go national, but "right now, we are talking to a group of users in North Carolina who are setting up a chapter. Further, we have had inquiries from the San Francisco area and St. Louis area," he added.

The problem and danger in going to a national organization, according to Del Gardo, is the temptation to move too fast and forget the original goals. "To avoid this problem, we are going to make sure that each branch is fully functional and integrated into Guidance before we move on to the next chapter," he noted.

Other S/3 users interested in the concept or wanting to learn more about the Guidance International Organization can write Del Gardo at 261 5th Avenue, 10016.

Tight Control Cuts Film Loss

MEMPHIS – Officials of Motion Picture Laboratories, Inc. here are attacking the problem of film loss and controlling a raw film inventory with a small computer.

"We are recovering in a few months the total cost of our computer," said Frank McGeary, MPL president, "in closer control of the tens of thousands of dollars worth of film losses we've experienced in recent years."

MPL is a motion picture processing lab handling feature films, industrial and training films, documentaries, etc.

The computer monitors the printing of 25 kinds of raw film on each of the automated, high-speed film printers, he said. This monitoring gives management moment-by-moment control of its raw film inventory and provides a countercheck on MPL's billing system.

How Much Each Day

"Before we automated the control function," McGeary said, "we only knew at the end of each month how much footage had been lost through oversight, rework or carelessness. Now we know on a job-by-job basis exactly how much raw material we consume each day."

Key to increased control is a small computer to handle all data associated with film printers working two shifts, five days a week, he said.

Each of the Bell & Howell Model C printers is tied to an IBM System/7. The computer prohibits use of any film printer until appropriate data is typed into the system.

An operator keys in his identification number, work order of the job to be printed, machine number, type of film to be used and the number of prints to be made.

Then the computer turns on the printer and counts the actual footage consumed in the job, logging all appropriate information for later recovery.

At the end of the printing run, the operator signs off and the computer turns the printer off, signalling the end of job.

At the end of the day, the computer prepares a punched paper tape which contains summary information and data about each job.

This information is used to maintain a perpetual inventory on each of the 15 types of film MPL uses. Job costing information is used to double-check billing processes and tabulate average footage factors per print in each job.

Want more tape-storage capacity with your present canisters and library?
Here's our angle.

Four degrees.

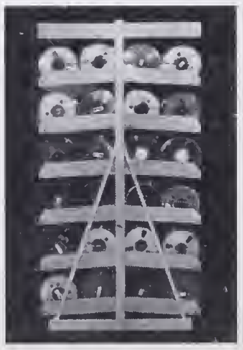
That's Tiltshelf's angle of incline. Tiltshelf stores tapes in tandem, two deep, and our little 4° forward angle allows the second tape in each slot to roll quickly into a Ready position when the front tape is pulled.

But the angle is just a sidelight; the big story is two-deep tandem storage. Because of that, Tiltshelf can almost double your tape-storage capacity by using one storage shelf where you presently use two. That turns exactly 50% of your present, useless aisle space into working, profitable storage space. Thereby increasing your storage-density, which speeds up filing and retrieval, which lowers your retrieval costs.

Another bonus: your most-frequently-used tapes naturally wind up at the front of each slot, further increasing your efficiency. And, perhaps the biggest bonus—you don't have to change canisters when switching to Tiltshelf.

So—our angle can cut your tape-storage and retrieval costs, boost efficiency, increase your tape library capacity without increasing your rent, and other things. For the complete story, contact your local TAB representative. Or, write Tab Products Company, 2690 Hanover Street, Palo Alto, California 94304.

We'll show you some more interesting angles.



Tiltshelf ® RSC 1972

TAB
PRODUCTS CO.

Relating Cost to Need

Backup Power: Who Needs It and at What Price?

By Michael Weinstein
Of the CW Staff

Users contemplating installing an uninterruptible power supply (UPS) system can estimate the initial cost with the formula of $1 for every watt of power required.

For example, a UPS system for a medium-sized computer requiring 45 kVA would cost about $45,000.

Such a system would be able to drive two typical IBM System 360 or System 370 processors and related peripherals.

As power requirements increase, the $1/W relationship decreases so that a system needing 150 kVA would cost less than $150,000.

For smaller systems – less than 45 kVA – the price per watt will increase, thus, a system needing 25 kVA continuous power would cost more than $25,000.

But for initial estimates, the $1/W formula gives users a benchmark for future investigation.

Two Functions

UPS systems perform two major functions: while the outside power is flowing, they act to smooth out spikes and drops in the line voltage and when the power fails they provide an alternative power source.

Analysis

Because of the types of problems that can be caused by a total power blackout a major consideration in investigating UPS systems is the time and efficiency with which they can keep the computer up and running during power failure.

Most battery-based systems are designed to keep the computer operating for one to 60 minutes.

The rationale behind the average 15 minute power backup is that after this time the computer will begin to feel the effects of lost air conditioning and users may feel the effects of lost lighting.

To build a system that would also drive the lighting and the air conditioning would require a much greater power potential and the cost would rise through the $1/W relationship accordingly.

In the limited time backup system the normal operating procedure is that if the power has not returned in about five minutes, the user has time to orderly shut down his operations.

For long periods of time, users must turn to some sort of generator system – such as an internal combustion engine.

Teamwork

Normally, such a system is used in conjunction with the shorter-term system so the user has one system for the first few minutes of a power blackout and another to take charge for longer periods.

One reason for the two systems is that at the time of the power blackout the backup system must immediately kick in. There is no time to start an engine-driven generator.

Any interruption can result in either equipment damage such as head crashes or in lost or incorrect data being read or written.

The power companies are neither prepared nor willing to design power distribution networks that offer power levels to insure that these problems do not occur.

For the majority of users, a drop in voltage means an electric motor winds down or the lights flicker.

The utilities argue that providing fail-safe power to computer users would mean large added costs to all electricity users. So far this argument has been strong enough to deter any major effort to improve power quality.

Printer/Plotters Make an Entry

• Electrostatic Device Gives Alphanumeric And Plotted Output

CUPERTINO, Calif. – Two large electrostatic raster scan plotting devices, one of which allows users to mix alphanumeric and graphic output, have been announced by Versatec, Inc.

The two units – Matrix Model 2000 Plotter and Matrix Model 2000A Printer/Plotter – use 20-inch wide paper in rolls 500 feet long.

Plotting can be done in an area 18.56 inches wide by any length up to 500 feet. Principal applications for a plotting capability this large are expected to be in the areas of architectural drawings, IC and PC board layout, weather mapping and plotting geophysical data.

The Model 2000 has 100 nib/in. resolution and a total of 1,856 nibs for plotting across the 18.56-inch plotting line.

Two hundred and thirty-two 8-bit bytes compromise one scan of plotting data with each data bit relating to one nib in the writing head.

An incremental paper drive stepper motor moves the paper at 0.8 in./sec.

The Model 2000A operates in three separate modes: printing, plotting and simultaneous print/plot.

It has the same plotting characteristics as the Model 2000 and, in addition, can print 232 7 x 9 dot matrix characters across the page from Ascii input data.

The Ascii input is decoded and converted to characters by means of a read-only memory included as standard hardware.

Simultaneous print/plot operation permits 80- or 132-column character printing on one side of the paper and simultaneous raster scan plotting on the remainder of the paper width, or print and plot may be intermixed as desired.

Unit price of the Model 2000 is $8,900 with the price of the expanded Model 2000A set at $10,900 from 10100 Bubb Road, 95014.

• 1,200 Line/Min, 132 Char./Line Unit Offered Mini Users

NEWTON, Mass. – An electrostatic printer/plotter designed to interface with most minicomputers is available from Gould Data Systems.

The Gould 5000 prints alphanumeric data at 1,200 line/min and plots graphic material at 3 in./sec.

It has an eight-bit data path for input from the host minicomputer, and includes a 64-Ascii character, 7 x 9 dot matrix font. A 96-Ascii character, 7 x 9 dot matrix font with upper and lower cases and a 128-character, 7 x 9 dot matrix (custom mode) font are optional.

When used in the print mode, the Gould 5000 generates 132 char./line. When used in graphic mode, resolution is 100 dot/in. vertically and horizontally.

Computer printout is on 11-inch wide paper. The unit has a 1000-sheet fanfold paper-handling capacity and accepts 400 feet of paper rolled on a three-inch internal diameter core.

Base price of the Gould 5000 is $7,600 with printing and plotting software packages and interface hardware packages available for most minicomputer systems from 20 Ossipee Road, 02164.

Gould printer/plotter prints alphanumeric data at 1,200 line/min and plots graphic material at a rate of 3 in./sec.

Fixed-Head Disk Promises Double Access Speed for PDP-11 Users

SAN DIEGO – For about one fourth the cost, PDP-11 users can receive a fixed-head disk subsystem with twice the access speed of standard Digital Equipment offerings, according to a spokesman for Pacific Micronetics.

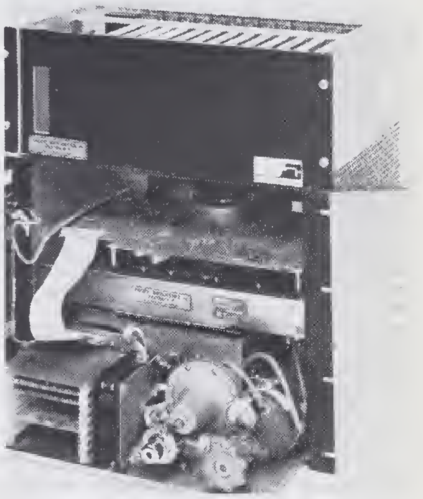
Capacities for the new line of disk memories range from 256K to 8.3M words per device. All units are hardware-compatible and sizes up to 2M words are fully compatible with DEC's Disk Operating Software Program.

Each of eight intermediate capacities is available in a single disk module or may be field-expanded from smaller modules.

Four Times as Fast

Pacific's disk subsystem is offered in either 8.4 msec or 16.8 msec access times with all units designed for 4.1 µsec/word transfer rate. This is about four times the speed offered by DEC, the spokesman asserted.

Prices range from $10,000 for a 256K-word subsystem with a 16.8-msec access time to $36,000 for a 2M-word subsystem with the faster 8.4-msec access time.



Fixed-head disk subsystem can build up to 8.3M words of on-line storage.

Comparably sized DEC subsystems would run about $14,000 and over $70,000 respectively and are only offered at the slower 16.8 msec access time, the spokesman concluded.

Deliveries run about 60 to 90 days from 5037 Ruffner St.

The Newest Math:
370+CIS=E

The "E" is for economy - real savings on your monthly systems costs. If you rent or plan to rent your 370, we'll arrange to replace your IBM rental program with our 370 lease package. If you own your 360, we'll buy the system in trade for our 370 lease package. The out of pocket dollar savings will amaze you.

CIS
CONTINENTAL INFORMATION SYSTEMS CORPORATION

PITTSBURGH, PA. – RON SIMMONS
345 Mt. Lebanon Boulevard 15234
(412) 341-0585

HARTFORD, CONN. – ART QUIRK
60 Washington Street 06106
Suite 1305 (203) 249-0937

McLEAN, VA. – AL SNEDEKER
1651 Old Meadow Road 22101
Suite 418 (703) 893-0072

SYRACUSE, N.Y. – HARRY MILLER
Midtown Plaza 13210
(315) 474-5776

Delivery on 125's, 145's, 158's, & 168's available.

CIS is able to deliver these units directly from our "on order" inventory. Call Dean Harrer or Ed Tibbits in Syracuse at (315) 474-5776 for details now.

Can Be Cheaper, Faster

Some Plotter Users 'Could Do Better With Printers'

By Michael Weinstein
Of the CW Staff

BOSTON – Many users presently using plotters to produce blueprints or for other large drafting applications could perform the same functions at about one-fifth the cost with electrostatic raster printers, according to John Nilsson, director of Decision Graphics Inc. (DGI).

In his own architectural operation, Nilsson uses a Gould 4800 electrostatic printer driven by a PDP-15/20 with 32K words of core memory and two fixed-head disk subsystems with a total of 500K words of on-line storage.

One function of this system is to produce architectural drawings for DGI's parent firm, Perry Dean & Stewart.

Drawings are produced by taking output from the electrostatic printer, which comes in strips 7-1/2 in. wide, and taping these strips together to form larger drawings, Nilsson explained.

For example, a final drawing 48 in. by 45 in. is made by aligning and carefully taping six strips of printer output, each 48 in. long, he said.

The taped composite drawing is then taken to a photographer who provides Nilsson with a positive for use in producing additional drawings with a blueprint machine.

'One-Fifth as Costly'

"When we compared our method with the conventional method of producing computerized drawings – using a flatbed plotter – we found the electrostatic approach is about one-fifth as costly in equipment alone," Nilsson said.

"In plotter applications for large drawings users must take the equipment off-line, and thus must buy a tape unit or some other storage device to drive the plotter. A typical system might cost about $50,000," he said.

"And electrostatic printing can also be used for alphanumeric printing while the plotter user generally needs a separate printer which must be added to equipment costs," he said.

Added to the cost advantages, Nilsson also stated there is a marked speed advantage when using electrostatic printers.

"For large drawings, a plotter might take well over an hour to produce the final drawing. The same drawing can be produced in strips by our printer in about three minutes. Even if it takes someone 10 more minutes to tape the strips we are still over an hour ahead of the plotter," Nilsson said.

Another problem inherent with plotters, according to Nilsson, is that they depend on the mechanical use of pens which can dry up and skip in the middle of a drawing.

"If this happens, the entire drawing is lost and the user must start again," he said.

As to the quality of final drawings – plotter vs. electrostatic printer – Nilsson stated there was not a crucial difference in his application.

"While it is true that the plotter approach produces sharper lines," he said, "the photographic process and the blueprint machine tend to close the dots printed by the electrostatic printer so that the final drawing looks like it was drawn with continuous lines.

"Presently, we are using this process to design buildings for the U.S. Army and all final drawings have been up to military and government standards," he added.

For users contemplating this approach, Nilsson said, the software needed to produce the strips from which drawings are made is generally available from the printer supplier.

Machine Language Used

"Initially we tried to write our own code in a higher level language (Fortran) but it became too complex and required too much time for execution. The only practical approach is to have the software written in machine language," he said.

"Concurrent with our activities, Gould was working on providing a similar software capability written in machine language for the PDP-15. When we learned of their efforts we cancelled our project and adopted their software. This has been used quite successfully with some modification," Nilsson concluded.

"Thus, I am sure that software exists for PDP-15 users but I also think that the vendors – primarily Gould and Versatec – have written similar programs for other mainframes."

NCR Cuts Rental On 50, Reduces 50, 100 Purchase

DAYTON, Ohio – NCR 50 users can reduce rental charges on their systems through a new extended-term rental policy. NCR has reduced the purchase price on both the 50s and Century 100s.

The company is offering three- and five-year rental contracts on Century 50 systems based on less than 100 hr/mo system usage.

The three-year plan, covering a basic 16K-byte system with an 8.4M-byte disk storage subsystem and a 200 line/min printer, will rent for $1,450/mo.

For a five-year contract on the same system, the rental will be $1,350/mo. Usage above the 100-hr contract limit is billed at $3.50/hr.

No Change Here

NCR's previous one-year rental contract based on a 200 hr/mo usage at $1,575/mo remains unchanged. Further, rental contracts based on the 100 hr/mo usage are not available on a one-year lease.

But users who currently have one-year lease plans can convert to extended-term contracts.

Concurrent with the release of extended-term plans, NCR has reduced the purchase price of the Century 50 from $88,000 to $71,500.

NCR Century 100s have also been reduced from $105,000 to $89,000, a 15% savings.

Tape Winder a 'Sidewinder'

ANDOVER, Mass. – Paper tape users can obtain an electrically driven tape winder for spooling long tapes from Peripheral Graphics, Inc.

The Sidewinder has a 7-in. tape reel which allows users to wind up to 800 feet of tape in one operation.

Price of the winder is $49.95 from Shetland Properties, York St., 01810.

We give you Computer, Peripheral and Software Information for less than $250 and back it up with Free Telephone Inquiry

AUERBACH has prepared, especially for EDP users, a unique, ready reference service that provides the information you need to operate your EDP facility at maximum efficiency and at minimum cost.

The *AUERBACH EDP Users' Notebook*, in addition to saving you time and money, buys you protection against future information slippage. As the recognized watchdog of the EDP industry, we'll see that nothing important slips by without being brought to your attention.

We have been the leader in providing EDP information for nearly 15 years, but we have never offered a service for Data Processing Managers that is as useful, comprehensive, timely, complete and authoritative as the *AUERBACH EDP Users' Notebook*.

What's in it for you

The *AUERBACH EDP Users' Notebook* initially contains highly detailed reports on 25 important general-purpose computers, small business computers and minicomputers; 33 commercial system support software packages; 74 major and independent peripherals, which include devices, magnetic tape, disc storage, data handling, OCR and mark sense peripherals; and 17 data communications terminals. These reports will be updated and new reports added monthly.

In addition more than a dozen search charts pinpoint the characteristics and capabilities of 1,000 different devices, including 286 computer systems, 540 peripherals and 225 data communications terminals *providing you with the single most comprehensive source of information available today*.

Prepared by a research staff of 30 with a combined experience of more than 200 years in the EDP field, the *Notebook* covers every significant product offering in hardware, software, peripherals and data communications.

You could subscribe to 26 industry publications, pour over hundreds of EDP reference books, spend thousands of costly manhours . . . and still not get the breadth or caliber of EDP user information found in the new *AUERBACH EDP Users' Notebook*.

The two-volume set comes in simple, looseleaf form. It's organized by product categories for easy use. And it's updated monthly – our guarantee against your development of an information gap.

A one-year subscription is $245. With your subscription you'll receive our monthly newsletter, *AUERBACH Reporter*, plus access to *AUERBACH's Telephone Inquiry Service*.

To order your *AUERBACH EDP Users' Notebook* or request additional information, send the coupon today.

To: AUERBACH Publishers Inc.
121 North Broad Street
Philadelphia, Pennsylvania 19107

Gentlemen: I wish a ☐ 1-year $245 subscription to the *AUERBACH EDP USERS' NOTEBOOK*, the free monthly newsletter, *AUERBACH Reporter* and *AUERBACH's Telephone Inquiry Service*.

☐ Payment enclosed ☐ Bill my company ☐ I wish more information.

Ship to:

NAME

TITLE

COMPANY

ADDRESS

CITY

STATE ZIP

AUTHORIZING SIGNATURE

AUERBACH ®

73G

See Our Special NCC Convention Offer At Booth 2017

Special Interest Groups Plan Meetings During NCC

NEW YORK – With only one national industry-wide show this year, several special interest groups will be capitalizing on the opportunity to hold meetings before, during and after the regularly scheduled National Computer Conference (NCC) sessions.

The ACM has scheduled a member/officer forum on Wednesday, June 6, from 5:30 – 7 p.m. The main emphasis will be on questions and comments from the members, although the officers will also be prepared to present specific items for information and feedback. Jean Sammet, vice-president, will chair the meeting.

Also on Wednesday, from 9 – 12 noon, the Community/Junior College Committee will hold an open meeting to discuss educational problems.

The ACM Standards Committee is scheduled to meet Tuesday afternoon, June 5; the IEE Computer Society's Standards Committee will convene at the same time.

Societies/ User Groups

The special interest groups of the Association for Computing Machinery have scheduled meetings beginning Monday, June 4 through Thursday.

These include meetings on Monday of the Joint Users Group, 1-5 p.m.; SigCosim (Computer Systems Installations Management), 6-7 p.m.; SigUCC (University Computing Centers), 7-10 p.m.; SigOps/IEEE Technical Committee on Operating Systems, 8-9:30 p.m.; and SigCue (Computer Uses in Education), 8-10 p.m.

On Tuesday, 8-9 a.m., the SigOps will have a business meeting. At 4:30-5:30 p.m. Student Chapter Representatives will meet, and from 6-7 p.m. SigLash (Language Analysis and Studies in the Humanities) will assemble for a business/technical meeting.

Wednesday's meetings include SigSim (Simulation), 7:30-9:30 a.m.; SigBDP (Business Data Processing), 7:30-9 a.m.; SigCas (Computer and Society), 7:30-9 a.m.; and Chapter Chairmen, 8:30-12 noon.

From 9-12 noon SigArch (Architecture of Computer Systems) will meet. Other Wednesday meetings include SigSoc technical meeting (Social and Behavioral Science Computing), 1:30-5:30; SigArt (Artificial Intelligence), SigBio (Biomedical Computing), SigComm (Data Communications), and SigMe (Measurement and Evaluation), all from 8-10 p.m.

On Thursday, SigPlan (Programming Languages) convenes from 8-10:30 p.m. The ACM Council meeting begins in the evening, 8-11 p.m. and reconvenes Friday at 9 a.m.

ACM's Sigplan/Sigmicro Set Languages Meeting

NEW YORK – Topics to be covered at ACM's Sigplan/Sigmicro Interface Meeting, scheduled for May 30 – June 1 at the Arden House in Harriman, N.Y., include "functional memory-based dynamic microprocessor for higher-level languages;" "language-oriented instruction sets;" "a general-purpose high-level language machine for minicomputers;" and "Basic semantics: microprogramming as a tool for teaching programming languages."

Fee is $30 for ACM members; $35 for (non-ACM) Sigplan or Sigmicro members; and $40 for others. Vice-chairman for the meeting is Dr. Stanley Habib, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn, N.Y. 11201.

Virginia DPers Join Forces

RICHMOND, Va. – This city's DPers, in conjunction with all other municipalities throughout Virginia, have formed an association titled the Commonwealth of Virginia Information Sciences (Covis).

The association will provide a means for its members to exchange information, experiences and concepts. Covis will also participate in the development of government information systems.

CSMA Conference To Visit 5 Cities

WILMINGTON, Del. – The second annual National Communications Week sponsored by the Communications Systems Management Association (CSMA) will cover five cities in as many days, June 25-29, starting in New York City and moving through Philadelphia, Washington, D.C., Chicago and San Francisco.

The theme of the conference is "data and voice communications, user selection techniques" and includes programs on the total systems approach to planning, evaluating and selecting a communications systems.

The tutorial part of the program features such topics as "identifying systems objectives," "selection criteria," "systems synthesis," "effectiveness vs. efficiency" and "cost vs. performance."

CSMA is at 1102 West St., Suite 1003, 19801.

STILL WAITING?

WE'LL SHIP YOU A CDI TELETERM® IN 7 DAYS*

OR ELSE.

Get a CDI Model 1030 TELETERM portable time-sharing terminal by next week. Just send us a bona fide purchase order for $3,100. It we take longer than 7 days to get your TELETERM on its way, we'll give you a whole case of paper. Free.

The CDI 1030 is a lightweight, quiet, reliable terminal using a thermal printing technique. It operates at 10, 15 or 30-characters per second and is perfect for time-sharers on the go.

So don't just sit there and wait. See how fast you can get a TELETERM of your very own!

*A.R.O.

a TECHVEN corporate partner

COMPUTER DEVICES INC
9 Ray Avenue
Burlington, Mass. 01803
(617) 273-1550

®Reg. U.S. Pat. Off.

YOU CAN GET THE BEST AUDIO-VISUAL EDP TRAINING SYSTEM FROM CONTROL DATA OR McGRAW-HILL.

THEY GET IT FROM EDUTRONICS.

Edutronics is the leading producer of audio-visual systems for training of EDP professionals. In fact, thousands of people—from programmers through top management have learned how to use EDP more effectively because of our films, tapes, study guides, workbooks and other materials.

So it's not very surprising that two of the largest educational companies in the world—CONTROL DATA CORPORATION and McGRAW-HILL—selected the EDUTRONICS system as an important element in their own product lines. They both have the resources to produce good audio-visual training materials. But why 're-invent the wheel' when the *best* is already available. From EDUTRONICS.

If you're in industry and presently looking for a way to improve internal communications, especially within the data processing department, check out the EDUTRONICS TOTAL SYSTEMS APPROACH. We have more than 300 lessons with messages people won't forget. They're grouped into modular courses, covering everything from fundamental computer concepts to sophisticated techniques and applications. The result is something for everyone, regardless of specialization, corporate position or economic justification.

If you're in a school or a college, you should get it from McGraw-Hill.

If you're in business or industry, get it from Control Data . . . or us. EDUTRONICS!

Edutronics
systems international, inc.
Lakeside Office Park, Wakefield, Mass. 01880
(617) 246-0914
Offices in Los Angeles, New York, Chicago, Kansas City, Boston,
Toronto, Paris, London and other principal cities.

A Subsidiary of Coleman American Companies, Inc.

Training Available?

Demand for Beginning Programmers Continues to Grow

J. Daniel Couger On

Education

Despite the present market conditions, the demand for computer programmers is expected to continue to grow. The American Federation of Information Processing Societies conducted an exhaustive study last year to determine just how many people were in the data processing field. The study, by Bruce Gilchrist and R.E. Weber, showed 1 million people employed in the field, including 150,000 systems analysts; 210,000 programmers; 200,000 computer operators; and 440,000 keypunch operators.

The Gilchrist/Weber study produced results remarkably close to those made by the Bureau of Labor Statistics in the Occupational Outlook Handbook. The BLS study was based on average staffing size per particular size of CPU, the numbers of the various size CPUs in use and correction factors for productivity changes. The Gilchrist/Weber study analyzed a variety of sources, from both government and industry.

The BLS study indicates a strong demand for programmers through 1980: an average of 23,000 will be needed each year. This demand is comparable with that of other professional occupations for the same period.

The key question, of course, is whether the present educational programs are producing above or below the average annual forecast demand of 23,000 programmers. Although precise figures on entrant programmers are not available, another Gilchrist/Weber study estimates that only 5,000 out of 7,500 persons with associate degrees in data processing entered the DP labor force in 1971. There should be a high correlation between associate degree graduates and business programmer entrants.

Afips has estimated that 122,400 entered the labor force from all computer-related educational programs in 1971.

That figure includes not only programming, but all entrants to the data processing field: key entry, unit record, computer operators, etc. Large numbers of programmers are produced by the private EDP schools. In addition, the computer manufacturers' courses and industrial in-house training provide widespread programmer training.

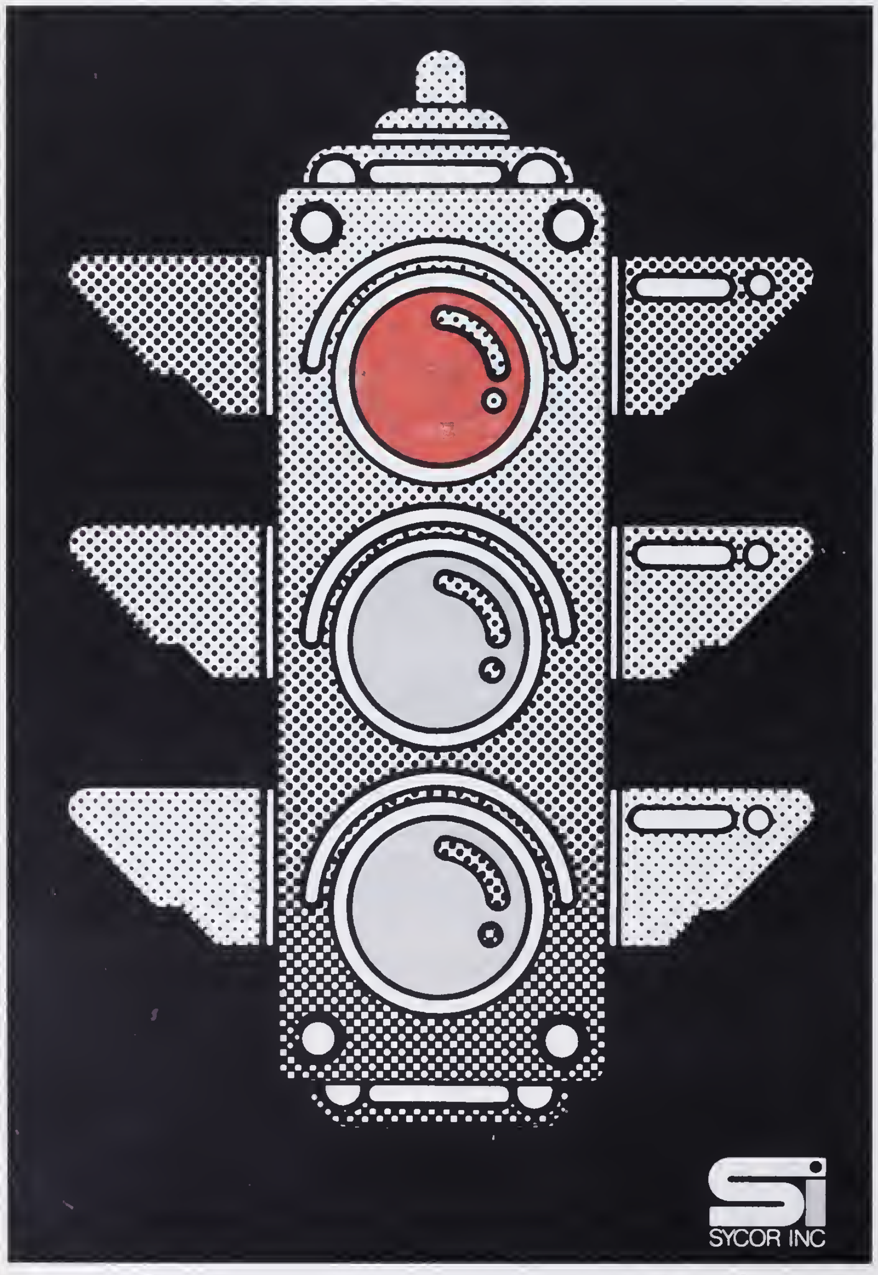
The past two years saw a drastic "culling" of marginal quality training organizations. On the other hand, the remaining demand reveals ample opportunity for growth of high quality training and education programs.

Couger is professor of computer and management science at the University of Colorado.

Occupational Group	1968 Employment	% Growth Forecast 1970-1980	Net Increase in Occupation	Average Annual Openings (not incl. Transfers)
Programmers	175,000	129	200,000	23,000
Engineers	1,100,000	40.2	400,000	73,400
Accountants	500,000	43.4	220,000	33,200
Systems Analysts	150,000	183	275,000	27,000
Physicians	295,000	53.1	155,000	20,000

The Bureau of Labor Statistics Forecast of Staffing Needs for the Period 1968 to 1980

OUR INTELLIGENT TERMINAL DOESN'T ALWAYS DO WHAT IT'S TOLD.



Our intelligent communications terminal, the Sycor 340, can be very obstinate.

Like the times an operator inadvertently enters the wrong data.

Perhaps she omits an entry. Or tries to enter a number that doesn't pass the range check.

An alarm buzzes, the keyboard goes dead, and the entry that's incorrect blinks on and off.

Your operator corrects it on the spot. And you save time and money.

And when she's got the clean data ready, the 340 can transmit it unattended at 1200 to 4800 baud speeds.

But clean source data entry isn't the only advantage of an intelligent communications terminal.

The 340's 8K bytes of programmable memory, and our special terminal application language (T.A.L.), make our terminal putty in your hands when it comes to tailoring it for specific applications.

And with capabilities like customized field validation, conditional data entry and arithmetic operations, you've got the tools you need to tackle applications you may not have had in mind when you first leased it.

Our intelligent terminal has some pretty smart peripheral equipment, too. Like remote printing capability from 30 cps to 300 lpm.

Before you lease, check into our intelligent terminal that doesn't always do what it's told. More than 6,000 Sycor terminals are now being obstinate in 33 countries around the globe.

And you'll find a world of uses for them right at home.

SYCOR

Corporate Offices: Ann Arbor, Michigan 48104 (313) 971-0900. **District Sales Offices:** Atlanta (404) 262-2162 • Boston (617) 890-7290 • Chicago (312) 986-1833 • Cleveland (216) 831-8625 • Dallas (214) 521-6710 • Detroit (313) 522-0080 • Houston (713) 688-5224 • Los Angeles (213) 640-0120 • New York (212) 483-8188 • Philadelphia (609) 665-1170 • Pittsburgh (412) 922-3350 • San Francisco (415) 349-6626 • Washington (703) 525-7300. **In Canada:** Sycor International Ltd., Toronto (416) 429-0883. **Service Centers in 76 cities.**

Civil Service Unit Plans Seminars On Retrieval, Fiche

SAN FRANCISCO – Administrators, analysts and programmers in government DP installations will have a chance to learn more about storage and information retrieval techniques, and about computer/microfilm interfaces, at seminars scheduled back-to-back this August, by the regional office of the U.S. Civil Service Commission.

Concepts of storage and retrieval, costs of systems and their advantages/disadvantages will be covered Aug. 20-22. A "systems" approach to using CPUs and microfilm in combination will be the focus of a two-day session, Aug. 23 and 24, according to Dataflow Systems, Inc., which is presenting the courses for the commission.

The ADP Management Training Institute at the commission's office, 450 Golden Gate Ave., is handling registrations.

APL Services Cuts School, College Cost

TRENTON, N.J. – Educational institutions can use the time-sharing facilities of APL Services, Inc. for half the normal commercial rates, under a plan just announced by the company. The special rates only apply in off-peak hours.

APL/Service, the implementation of APL supported by APL Services, is available locally in Boston; Hartford and Stamford, Conn.; New York; Princeton, N.J.; Philadelphia; Washington, D.C.; Richmond, Va.; Miami; and Houston. Under the reduced rate plan, schools and colleges are charged $4/hr for connect time, 40 cent/sec for CPU time and $1/7,200 char./mo for storage, all based on an IBM 370/155.

APL Services is headquartered at 865 Lower Ferry Road, 08628.

Analysis Course Set

LOS ANGELES – A short course covering modern approaches to data analysis and forecasting will be offered at the International Hotel here June 5-8. Prepared by Technology Service Corp. (TSC) of Santa Monica, the course will examine nonlinear regression, classification analysis, cluster analysis and hypothesis/significance tests.

Emphasis will be on computer-based analysis of multivariate data.

The course fee of $350 includes materials, texts and luncheons. TSC is at 225 Santa Monica Blvd., Santa Monica, 90401.

CI Notes

SBC Death Seen in 1970

TULSA, Okla. – IBM had decided as early as July 1970 that "the service bureau business is not a sound one for IBM," recently available IBM management committee minutes indicated.

However, the management committee felt it would be "undesirable" to get out of the business in 1970 or 1971 because of the impact on corporate profitability, according to the minutes.

At the same time the management committee decided to investigate various alternatives of getting out of the business.

DEC Drops Lockheed Suit

BOSTON – Digital Equipment Corp. has agreed to drop its patent infringement suit against Lockheed Electronics.

In the suit, DEC charged that the addressing techniques used by Lockheed's Sue minicomputer infringed on patented techniques for DEC's PDP-11.

DEC said a countersuit filed by Lockheed to block the DEC suit is also being dismissed.

CA Toots Famous Horn

IRVINE, Calif. – Computer Automation, Inc., maker of the Naked Mini, brought out its air horn to herald new contracts for more than $3 million. Since the firm moved to Irvine, it has resumed blowing the horn for orders, but only for orders over $1 million.

Previously, the firm blew the horn for each order over $10,000, but had to silence the horn because of neighbors' complaints.

Supershorts

Itel has arranged a $10 million revolving line of credit with a group of banks for a subsidiary of Itel Finance Corp. The line will be used to finance the receivables associated with the sale of ISS products to OEMs.

– – –

Datasaab, division of Saab-Scania, has established U.S. headquarters in New York, with C.E. Jacobsson as general manager, U.S. operations. The firm is promoting its on-/off-line banking terminals and minicomputer products.

– – –

Fabri-Tek, Inc. has signed an agreement with Microteck, Inc., Jogjakarta, Indonesia, that will effectively almost double production capabilities through the addition of 800 people to string memory planes and stacks.

– – –

Computer Machinery Corp. has named General Computer Services, Inc. as distributor for its products in Puerto Rico, the Dominican Republic, Haiti and the U.S. Virgin Islands.

'Predatory Practices'

Telex Sets IBM Damage at $361 Million

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. – Before resting its case in its antitrust suit against IBM, Telex financial authority James Heavner indicated that Telex had suffered damages amounting to $361.3 million as the result of IBM's "predatory practices" in the peripheral marketplace.

Heavner said Telex had lost $11.3 million because of cancellations by leasing companies of contracts to buy Telex equipment.

In addition, he said, because Telex had reduced the prices on rented equipment in the field in response to such IBM actions as the 2319 disk drive price cut, this had caused losses amounting to $92.3 million.

Earlier testimony indicated that Telex had reduced the prices on all installed rental equipment even though IBM had announced the cost reductions only for the 2319-type drive.

Telex had done this because the 2319 was compatible with all of its 2314-type disk drives installed.

In addition, Heavner said Telex had lost another $257.7 million because it was deprived of its "rightful share" of the market due to the IBM actions such as on the 2319, the fixed-term lease plan and the extended lease plan.

In the case Telex is asking for a trebling of these damages, thus bringing the total to the $1.2 billion figure announced for the case. Treble damages are permissible in antitrust cases if one firm is found guilty.

The last Telex witness, Steve Jatras, Telex president, noted Telex had had the image of a growth company with investors and the general public, one that was "going to the moon," before the alleged IBM predatory practices.

But the IBM announcements of the fixed-term plan and other product adjustments made users wonder about the viability of Telex and whether it would be able to stay in the business, Jatras related.

After the IBM actions, he said, Telex had had more difficulty in getting loans and had also had some trouble recruiting personnel.

At the same time, he said, Telex had been a profitable operation prior to the moves and the IBM actions had made it unprofitable. He indicated the firm would show a loss of $8 million before taxes for its 1973 fiscal year.

In addition, he stated, at the end of 1969 Telex stock had had a value of $19 per share in the market, but after the IBM moves this had dropped drastically and the current value is $4.63 per share.

On cross examination, however, Jatras admitted Telex had changed its method of accounting from the financing system to the operating system during the same time frame and that this was forcing the firm to take some writeoffs now that it would not otherwise have taken.

IBM Maintenance Profits Drop

TULSA, Okla. – When IBM asked for a maintenance price increase in 1971, which was temporarily delayed by the Nixon Administration's wage price controls, IBM was – in its eyes – in an extremely bad position.

But most companies would prefer similar problems in keeping their profit levels up on maintenance.

According to a memo from D.W. Sweeney to P.M. Foley at IBM at that time, there was concern over the drop in maintenance service profitability in the prior two years.

In all, the gross profit as a percent of revenue had dropped from 52.2% at the end of 1968 to only 46.3% in July of 1970.

However, the net profit as a percent of revenues had dropped more dramatically – from 28.1% to 14.5%.

Memorex Confirms Financial Problems

SANTA CLARA, Calif. – Memorex Corp. has confirmed earlier reports in the *Wall Street Journal* that it does have financial difficulties and that the Bank of America, its largest creditor, has taken a major role in running its affairs.

The firm also said it is negotiating with firms to sell "a substantial equity interest" or to reach "some other form of business combination."

In addition, Memorex indicated that orders for its MRX mainframe series are "lagging."

President Laurence L. Spitters attributed the slow sales to "the newness of the systems product line to our equipment sales organization, the difficulty of initial entry into the market by a new computer systems supplier whose demonstrated capability isn't in systems products, and the hesitance of prospective customers engendered by adverse publicity regarding the company's financial condition."

Kroger Co. has cancelled an MRX order that would have produced $800,000 annual revenue, Memorex said.

Dedicated Application Market Expected to Triple in Five Years

NEWTON, Mass. – The dedicated application market will grow the most rapidly of any sector of the EDP industry in the next five years, according to *EDP Industry Report*, published by International Data Corp. here.

The market research firm estimated the revenues to U.S.-based manufacturers of dedicated application computers, most of which are minis, will triple between 1972 and 1977, growing from $560 million to $1.7 billion in 1977.

Shipments of dedicated machines rose 55% during 1972 to $560 million, setting the pace for continued rapid growth during the next few years, according to IDC.

Several factors contributed to the buying splurge, IDC said. The following factors were mentioned:

- "Pent-up user demand was unleashed as budgets loosened and the Phase II investment tax credits could apply.
- "IBM began volume shipments of its System/7, broadening the market base rather than increasing competition for the same dollars.
- "OEM manufacturers and systems houses further broadened the demand for minis as these sophisticated function boxes began to show up in terminals, machine tools and small business systems."

The "average" value of units shipped remained around $30,000, the same as in 1971, and IDC said it expects this level to continue for the next few years.

Although 50% or 9,400 of all dedicated application computers shipped in 1972 were in the under $25,000 price class, the total value of these shipments was $133 million or 24% of the $560 million total.

The $25,000 to $50,000 price range had 42% or 7,940 of the units shipped and held 50% or $278 million of the total value of shipments.

There were 1,200 units shipped in the $50,000 to $100,000 price range, accounting for 6% of the total number of shipments, but 16% or $90 million of the total value of shipments.

Units costing over $100,000 accounted for almost 11% or $59 million of the total value shipments, but numbered only 260 units shipped.

As typical systems in the various categories, the report mentioned the Nova and PDP—8/E in the under $25,000 range; the PDP—8/I, 11/20 in the $25,000 to $50,000 range; the IBM System/7 from $50,000 to $100,000 and SEL and GE/Pac in the over $100,000 category.

Check How Many In Your Industry Use MSA Software Packages

Industry	MSA Payroll/ Personnel	MSA General Ledger	MSA Fixed Assets	MSA Accounts Payable	MSA Inventory Control	
Manufacturing	✓	✓	✓	✓	✓	~~155~~ 158
Banking and Financial	✓	✓	✓	✓	✓	~~124~~ 127
Insurance	✓	✓	✓		✓	~~26~~ 27
Service Bureaus	✓	✓	✓			22
Retailing	✓	✓	✓	✓		~~18~~ 19
Public Utilities	✓	✓	✓	✓	✓	~~17~~ 18
Government and Healthcare	✓	✓	✓	✓	✓	16
Other	✓	✓	✓	✓	✓	~~72~~ 75
	~~175~~ 179	~~70~~ 73	~~140~~ 142	~~50~~ 51	~~15~~ 17	~~460~~ 462

- 462 Total Users
- Industry User Groups
- IBM, Burroughs, ICL Honeywell, Univac (RCA)
- Warranted Performance
- Exceptional Documentation
- Continued Enhancements

MSA

Atlanta 404–262-2376
New York 201–871-4700
Chicago 312–323-5940
Los Angeles 213–277-8411
San Francisco 415–328-1700

Please Send Information on
☐ MSA Payroll/Personnel
☐ MSA General Ledger
☐ MSA Fixed Assets
☐ MSA Accounts Payable
☐ MSA Inventory Control
☐ MSA Banking Packages
Time Deposit–Installment Loan

Name

Company

Address

City-State

Send to: William M. Graves
Management Science America
3445 Peachtree Road, N.E., Suite 1300
Atlanta, Ga. 30326

Contracts

Management and Computer Services, Inc. has received a two-year facilities management contract from the West Chester Area School District, Pa.

La Compagnie Generale de Constructions Telephoniques, a French subsidiary of ITT, has received a $2.2 million contract from Russia's Aeroflot airline, to install message-switching equipment. The system will supply passenger information to Moscow area airports.

Keane Associates, Inc. has received a software subcontract from IBM to assist in the development of an on-line teleprocessing system.

Microdata Corp. has been awarded a contract to supply 1600 minicomputers to Photon, Inc. for incorporation in the Photon Pace Setter System.

Rapidata, Inc. has signed a $7.7 million, three-year contract with the New York Telephone Co., superseding a one-year contract already in effect. The new agreement covers the addition of dual processors to each of the two single Honeywell 400 systems now serving the company.

American Management Systems, Inc. has been awarded a contract by New Populist Action, Inc., a citizens' organization founded by former Senator Fred Harris, to develop and maintain a computer-based Membership Information Communications System.

PHD Systems for Computing, Inc. has received a consulting contract from John Hancock Mutual Life Insurance Co. for automation of a claims inquiry system.

Xynetics, Inc. signed a contract with Camsco, Inc. to provide Model 2000 automated plotting systems for incorporation into computerized Camsco "Markamatic" and "Gradamatic" systems.

FM4 Gila River Corp., which is operated by the Indians of the Gila River Reservation, has received a subcontract from University Computing Utility Co. to assist in data conversion.

Multinational Earnings

Nixon Backs Current Tax Laws

WASHINGTON, D.C. – President Nixon has backed the current tax laws governing profits earned abroad by U.S. companies, and essentially added his weight to those opposing the entire Burke-Hartke bill.

"Our income taxes aren't the cause of our trade problems and tax changes won't solve them," he told Congress.

He said the basic system of taxing profits earned abroad is "fundamentally sound. We shouldn't penalize American business by placing it at a disadvantage with respect to its foreign competitors," he stressed.

The President urged Congress to "refrain from enacting broad new changes in our tax laws governing foreign direct investment . . . (until) we see what possibilities for multilateral agreements emerge" from trade talks between nations.

The current ability of a U.S. firm to subtract the income taxes it pays to foreign governments from its U.S. tax liability would be repealed by the Burke-Hartke bill, which would also allow the company to deduct foreign taxes from foreign earnings.

Currently, a U.S. company pays U.S. taxes only on profits it brings back to the U.S. in any given year, and can defer taxes on the rest until such time as profits are returned to the states.

Under the Burke-Hartke bill, all corporate income earned abroad would be subject to U.S. income taxes in the year it is earned.

Mr. Nixon pointed out that other firms would fill the vacuum if U.S. firms were not abroad. If U.S. firms are hindered in taking advantage of "investment opportunities abroad, we can only expect that foreign firms will seize these opportunities at our expense," he warned.

L.D. Altman to Assume Fabri-Tek Presidency

MINNEAPOLIS – L.D. Altman has been named president of Fabri-Tek, Inc. He was formerly executive vice-president of the firm. Altman joined Fabri-Tek from Control Data Corp., where he had been a corporate vice-president and general manager of the western division.

Other Moves

- Gene Nicholl has been named president of DPA, Inc., a DP equipment leasing subsidiary of Pioneer Texas Corp. A former employee of DPA, he served with the firm for almost five years and was a vice-president before resigning in 1962.
- Dr. Robert Worsing has been appointed vice-president, development and operations, for the Infonet Division of Computer Sciences Corp.
- John B. Jackson has been elected a vice-president of IBM, where he continues as president of its Federal Systems Division. He joined IBM in 1954 and has acted as president of the Federal Systems Division since 1969.
- Charles R. Williams has been appointed vice-president, western operations, for Sperry Univac. He was formerly director of field marketing for the firm's western operations. In his new position, he will be responsible for all marketing and services operations in 11 western states.

Executive Corner

- Lockheed Electronics Co., Inc. has appointed two new vice-presidents: Arthur H. Benner is company vice-president and general manager, Products and Systems Division; and Matthew E. Tutino is vice-president, assistant to the president.
- Howard K. Cooper has joined Macrodata Corp. as vice-president, marketing and sales. He was formerly president of Nucleonic Products.
- George A. Hallenbeck, formerly vice-president, contract programming, for Interactive Data Corp., has been named vice-president, marketing, for the firm. He will continue to coordinate the company's contract programming activities.
- John R. Coutts, formerly vice-president, marketing, has been named president of Bunker Ramo Corp.'s Information Services Division.
- Herman W. Pass has joined Terminal Data Corp. as vice-president, technical marketing and new products development. In addition, he will direct the development of advanced laser recording and optical data processing systems.
- James Clark has been appointed executive vice-president of Terminal Equipment Corp. He was previously vice-president, operations, with Tycom Systems Corp., a manufacturing subsidiary of Terminal Equipment.

WE RENT/LEASE MINICOMPUTERS.

We're Rental Electronics, Inc., and the minicomputers we rent/lease are Data Generals Nova 1200 series, with up to 32k core memory, and standard central processor options, interfaces, peripherals, and software (availability of software based on hardware configuration). Field service is performed by Data General's own field engineers. With a three-year lease, an 8k Nova 1200 with a teletypewriter (purchase price approximately $9,800) costs less than $250 per month, plus maintenance if desired. The same system, on a month-to-month basis, with maintenance, costs about $784 per month. Or, under a rental-purchase agreement, it's $980 per month, with a full 80% applied to your purchase after six months. For complete details, just write or call. We'll send along a detailed brochure.

REI

Rental Electronics, Inc.

A PEPSICO LEASING COMPANY

99 Hartwell Avenue, P. O. Box 223
Lexington, Massachusetts 02173 Tel. 617/862-6905

Gaithersburg, Maryland 301/948-0620 / Lexington, Massachusetts 617/861-0667 / Anaheim, California 714/879-0561 / Rosemont, Illinois 312/671-2464 / Fort Lauderdale, Florida 305/771-3500 / Dallas, Texas 214/638-4180 / Oakland, New Jersey 201/337-3757 / Ontario, Canada 416/677-7513 / Palo Alto, California 415/328-4525

Growth in Diversity of Components

Semiconductors Called Best for Any Digital Memory

By E. Drake Lundell Jr.
Of the CW Staff

BERKELEY, Calif. – Any digital memory requirement "can best be met using semiconductor technology," according to David A. Hodges of the Department of Electrical Engineering and Computer Sciences at the University of California here.

In a recent paper he noted that at present the diversity of the available components in this area was growing rapidly and the "optimum choice of components varies depending on the required storage capacity and on whether economy (component cost/bit), speed (access and cycle times), or usability (simplicity of timing, logic interfacing and powering) is of the first concern."

New Developments

At the same time, he said, new semiconductor processing techniques are being developed to improve the characteristics of semiconductor memory components and new forms of memories attractive for use in small systems and terminal applications are appearing.

Prices of large-quantity purchases – over 10,000 units – of semiconductor memory components "range roughly between $3 and $10 per component for designs that have been in production for a year or more," while the price of recently introduced devices "may be many times higher reflecting the supplier's attempt to recover development costs."

Price, he said, is less directly related to the number of bits per component than it is to "chip area, package cost, test cost, volume of production and competitive conditions."

The price of mature components, he predicted, will probably remain in the area of the $3 to $10 ranges rather than show radical departures from that level.

At the same time, Hodges forecast that the number of bits on a chip would continue to grow, but the rate of growth would slow down from the doubling every year that has been common in the past decade of the semiconductor memory business.

"The best single indicator of fundamental cost will continue to be the number of bits per component (bit density)," he added.

Today's bipolar RAMs and ROMs have access and cycle times that range from about 10 nsec to 80 nsec, while MOS units have a range between 80 nsec and 2 µsec, he noted, adding that "gradual reductions in these ranges are likely over the next few years."

The usability of semiconductor components, he said, is related to clock requirements, power supply requirements and address and data signal levels, and he noted that bipolar memories now available are easy to use since they meet most of these requirements as do the new 1K static MOS RAMs.

"Volatility of stored information used to be cited as a major disadvantage of semiconductor read-write memories," the researcher noted, but he added that "a variety of power supply backup, information storage backup and error correction techniques have been developed which eliminate volatility as a problem" for most systems.

At the same time, he said, "electrically alterable ROMs are being developed for the few applications where this still is a crucial issue."

Data on semiconductor memory components reliability indicates, he added, that component failure rates now fall between 0.0005% per 1,000 hours and 0.05% per 1,000 hours and that there is no significant difference between the MOS and bipolar units in this area of reliability.

What's Ahead?

However, to achieve these rates the components have to go through a careful burn-in period at the maximum rated temperatures to catch poor components, and he noted that during these tests as much as 1% of the units will fail and have to be rejected.

"Continuing attention to failure analysis, quality control in manufacture and screening and burn-in techniques could easily result in an order of magnitude of improvement in field service failure rates over the next few years," Hodges predicted.

At the same time, he claimed that both bipolar and MOS memory components are benefiting from new methods of manufacturing that will give them either higher densities or higher speeds or improve their usability in memory systems.

To date, he said, the memory market has been dominated by RAMs, ROMs and shift registers, but he stated that electrically alterable programmable read only memories would be available in the near future at only a slight increase in price over the more normally available ROMs.

Other new types of semiconductor memory involving "additional functional features obtained by using additional circuitry," in combination with the storage element, will also materialize in the near future, he predicted.

In addition, Hodges noted that "Content-Addressable Memories (CAM) have often been advocated as a replacement for the conventional location-addressed RAM in computer main memories" and that these devices were available to some extent today.

However, he found that "because the bit density is much lower than for RAM, the cost per bit is much higher," but predicted that "intensive development efforts might reduce the fundamental economic difference to a factor of two or so."

But even at this price reduction, he said, "CAM is not likely to find a major place in computer main memories" but will find its place in specialized applications requiring the storage of only a few hundred bits.

Growth Seen in Israeli DP

TEL AVIV, Israel – The total DP market in Israel is expected to rise about seven times above its current level in the next 10 years, according to a survey for the Israeli Ministry of Commerce.

An average annual growth rate of 22% is projected for total DP expenditures, with 60% of that figure devoted to teleprocessing and peripheral equipment.

Manufacturing of computers in Israel is expected to reach $120 million in 1981 from the current level of $11 million, the survey indicated.

About 65% of production in 1981 would be for export, the survey said.

COMPARE
370 LEASE
PLANS

	IBM	alanthus
TERM	4 YEARS	4 YEARS
RENTAL	100% MAC	88% INCLUDING MAINTENANCE
2 YEAR TERMINATION PENALTIES	6 MONTHS RENT	2 MONTHS RENT
ITC	4⅔ %	7%
RENEWAL	ANNUAL EXTENSIONS	MONTH TO MONTH
		In addition; call us for our unmatched 7 & 8 year financial leases.

alanthus

ALANTHUS CORPORATION
The 370
Leasing Company
White Plains, N.Y. (914) 428-3703
Oak Brook, Ill. (312) 654-4635
Palo Alto, Calif. (415) 326-0750
Atlanta, Ga. (404) 252-2991

Cambridge Results Top 1972

6-Month Earnings Up at 2 Memory Firms

Six-month reports were improved at both Advanced Memory Systems, Inc. and Cambridge Memories, Inc., with Cambridge's revenues and earnings exceeding the results for all of 1972.

Cambridge President Joseph F. Kruy attributed the strong half performance to acceptance of the 370/Stor and minicomputer add-on memories, and the firm's steadily increasing rental base.

Cambridge Earnings Soar

Cambridge's six-month earnings, including a $62,880 tax credit, totaled $258,488 or 20 cents a share compared with $47,857 or 5 cents a share in the 1972 first half.

Revenues more than tripled to $4.7 million from $1.5 million in a comparable year-ago period.

In the second quarter, earnings, including a $5,880 tax credit, totaled $140,076 or 11 cents a share, compared with $79,639 or 8 cents a share in the 1972 period. The 1972 figure includes a $38,277 tax credit.

Revenues jumped to $2.8 million from $872,163 a year ago.

Increased R&D

Cambridge has increased its R&D expenditures "substantially. We expect these measures to result in a high rate of new product introductions during the coming year," Kruy said.

Advanced Memory Systems' six-month earnings rose to $1.3 million or 74 cents a share, including a $616,000 tax credit, compared with a loss of $38,177 or 4 cents a share in the comparable 1972 period.

Revenues rose to $13.7 million from $4.8 million a year ago.

In the quarter, earnings totaled $695,201 or 38 cents a share, including a $321,000 special credit, compared with $287,616 or 19 cents a share in the year-ago period, which included $150,000 in tax credits.

Revenues for the second period rose to $7.5 million from $3.3 million in the same 1972 period.

LOW-PRICED
acoustic coupler
MODEL 150 . . . NO FRILLS
- For use with all Series 33 TELETYPE Terminals.
- Half/full duplex switch.
- Carrier indicator.

$147

COMDATA
7544 West Oakton Street
Niles, Illinois 60648
Phone: 312/692-6107
See Us In Booth 2016,
National Computer Conference

Wang Quarter Earnings Up

TEWKSBURY, Mass. – Wang Laboratories, Inc. posted increased third quarter earnings of over $1 million, but the nine-month report showed decreased earnings, attributed by the firm to marketing costs for the 1200 cassette typewriter.

In the first quarter, earnings reached a record $1 million or 26 cents a share compared with $889,598 or 22 cents a share in the year-ago period. Revenues reached $12.9 million, up from $9.8 million in the 1972 third quarter.

For the nine months, earnings declined to $1.8 million or 44 cents a share from $2 million or 50 cents a share in the 1972 period. Revenues rose to almost $33 million from $26.1 million a year ago.

Dr. An Wang said nine-month expenses for the 1200 typewriter exceeded income, primarily from short-term rentals, by about $1 million, but he expects that on a current monthly basis income will overtake expenses by June 1973.

The 2200 "Basic" language programmable calculator is being well received in the market, Wang said, and he anticipates sales of this product will become an important portion of the company's total business in the forthcoming periods.

WITH
STANDARD MEMORIES'
SMART® 360 COMPATIBLE CORE
YOU GET
MORE CORE FOR YOUR MONEY
IN A LOT LESS SPACE

Standard gives you more 360 core, in less space and at greater savings, than any other company. Our SMART system packs 256 kbytes in a desk-high cabinet just 23 inches square, and it's available for models 22, 30, 40 and 50.

Other features include bump store; modular design for field upgrades; CPU changeability; conversion of 2 usec model 30s to 1.5 usec; enhancement of model 30s to 256 kbytes and many more. For more information, fill in the coupon and mail it today!

I want to get the full story on how much I can save with your SMART® 360 core.
Name ______
Company ______
Address ______
City ______ State ______ Zip ______
Phone ______
360 Model ______ Date core needed ______
Capacity from ______ to ______ kbytes

STANDARD MEMORIES
INCORPORATED
A Subsidiary of Applied Magnetics Corp.
2801 E. Oakland Park Blvd., Suite 307 • Ft. Lauderdale, Florida 33306 • Tel.: 305-566-7611
TWX: 510-955-9828

TEC Records 9-Month Earnings

TUCSON, Ariz. – Record sales and earnings have been reported for the quarter and nine-month period ended March 31 by TEC, Inc., maker of CRTs and components.

In the quarter, earnings soared to $253,082 or 37 cents a share compared with $87,587 or 13 cents a share in the comparable 1972 period. Revenues climbed to $2.1 million from $1.3 million a year ago.

For the nine-month period, earnings rose 207%, to $475,383 or 70 cents a share compared with $154,877 or 23 cents a share in the same period last year.

Revenues rose 50% to $5.1 million from $3.4 million in the 1972 period, for which figures are restated.

Position Announcements

MANAGER PERIPHERAL SYSTEMS
ENGINEERING & DESIGN

Top level engineering and design manager needed for Control Data Corporation's newly organized end user peripheral systems division and business management office. Will manage a department responsible for developing CPU/controller interface specifications, unique controller design, hardware and software support, end user systems and applications support. 360/370 knowledge required. Please send your resume to:

J.P. Stathopulos
PERIPHERAL PRODUCTS BUSINESS

CONTROL DATA
CORPORATION

Management Office
Box O
Minneapolis, Minnesota 55440

An Equal Opportunity Employer m/f

HYDRA-MATIC
EDP Systems Programmer

Must have knowledge of IBM 360 and O/S operating systems. Also experience in assembler language coding and IBM O/S workshop sysgen courses.

Apply in person or forward resume to:

SALARIED PERSONNEL OFFICE
HYDRA-MATIC DIV.
General Motors Corp.
Ypsilanti, Michigan 48197

An equal opportunity employer

COMPETITIVE ANALYSIS
CONSULTANT

Control Data Corporation has an opening for a uniquely qualified analyst to assess technical capabilities and marketing practices of competitors in the computer industry. The successful candidate will have experience with a variety of computer systems. Should also have significant software experience, operating systems exposure and experience in writing RFP's and analyzing bids submitted in response. Position is located at the Corporate Headquarters, Minneapolis, Minn.

Send resume and salary history to:

Gail Bergsven
CONTROL DATA
CORPORATION
P.O. Box O
Minneapolis, Minnesota 55440

To investigate other opportunities nation wide, send your resume to, Control Data Corporation, Box 888, Minneapolis, Minn. 55440.

An Equal Opportunity Employer m/f

PROGRAMMER ANALYST

THE JOB

Major Midwest Bank is seeking proven performer experienced in time or demand deposit and MICR entry systems. Must be able to communicate effectively with non technical management.

REQUIREMENTS

Experience in successfully completing a large project. Ability to work without extensive supervision. A working knowledge of IBM 360-370 OS MVT with emphasis on COBOL. ALC experience helpful. University degree in mathematics, business, or physical science and a minimum of 2 years experience.

This position requires an individual who has the capabilities and willingness to move into Sr. Systems management within 2 years.

SALARY
Commensurate with ability. Send confidential reply to:

PERSONNEL DEPARTMENT
THE OMAHA NATIONAL BANK
17th & FARNAM
OMAHA, NEBRASKA 68102
An Equal Opportunity Employer

POSITION ANNOUNCEMENTS

COLLEGE COMPUTER PROCESSING CENTER ASSISTANT DIRECTOR

Queensborough Community College of the City University of New York has an opening for an experienced programmer/analyst. Must be capable of directing the design and implementation of administrative applications for on line and batch processing. Strong background in Cobol programming, some BAL and knowledge of telecommunications is required. Minimum salary of $17,830 with increments to $25,500. Send resume to:

Dr. George Alterman
Dean of Instruction
and Academic Affairs
Queensborough Community College
Bayside, New York 11364

GROWTH OPPORTUNITY

Young dynamic computer utility is expanding into scientific time sharing marketplace:

We Need a Man of Executive Caliber to Head Up This New Division.

The ideal applicant is described as follows.

Education

4 Degree: Math/Science Background

☆ 7-10 years Systems-Programming in scientific field

☆ 5 years experience customer-marketing contact

☆ IBM Large Scale Computer under OS Environment

Responsibilities

☆ Ability to develop, manage, train, motivate and market for major division of growing computer utility

Salary

☆ State requirements

Benefits

☆ Stock options, major medical and hospitalization

Send resume to:
NATIONAL TIME SHARING & DATA SERVICES
17 Court St.
Buffalo, N.Y. 14202

Computerworld Sales Offices

Vice President — Sales
Neal Wilder
Sales Administrator:
Dorothy Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606
Northern Regional Manager
Robert Ziegel
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606
Mid. Atlantic Regional Manager
Donald E. Fagan
COMPUTERWORLD
225 West 34th Street
Suite 1511
New York, N.Y. 10001
(212) 594-5644
Los Angeles Area:
Bob Byrne
Robert Byrne & Assoc.
1541 Westwood Blvd.
Los Angeles, Calif. 90024
(213) 477-4208
San Francisco Area:
Bill Healey
Thompson/Healey Assoc.,
1111 Hearst Bldg.
San Francisco, Calif. 94103
(415) 362-8547
Japan:
Yoshi Yamamoto
Nippon Keisoku Inc.
P.O. Box 410
Central Tokyo, Japan

POSITION ANNOUNCEMENTS

PRODUCT MANAGERS

Control Data Corporation seeks two experienced business office managers to assume complete profit and loss responsibility in PLUG COMPATIBLE COMPUTER MEMORY SYSTEMS and PLUG COMPATIBLE DISK SYSTEMS. These positions are immediately available in our end user Peripheral Systems business management office. Successful candidates will be responsible for developing business strategy plans and providing direction needed to ascertain the types of products and market areas we move into. Duties also include resource division funding, pricing, program management, scheduling, subcontract vendor selections and marketing support. Send resume to:

J.P. Stathopulos
Peripheral Products Business
Management Office

CONTROL DATA
CORPORATION

Box O
Minneapolis, Minnesota 55440
An Equal Opportunity Employer m/f

EXECUTIVE VICE PRESIDENT CHAIN STORE SYSTEMS, INC. MANAGEMENT INFORMATION SYSTEM

Medium-sized progressive innovator in the supermarket industry has established an MIS subsidiary and is seeking a unique individual for a demanding, but rewarding opportunity.

THE SUCCESSFUL APPLICANT:

- Will be operations officer of a dynamic, growing MIS business.
- Will expand existing international business base for software operations and technical services based upon internally used systems.
- Will establish both foreign and domestic data centers and technical staffs as required to serve customer needs.

HAS PRIOR EXPERIENCE AND EDUCATION:

- Is employed or has been employed by IBM.
- Will have a good knowledge of latest technology
- Will include four years EDP management and thorough knowledge of advanced computer/communications based systems.
- Teleprocessing experience a major plus.
- Will include the selection of computer/communications hardware and the operation of data center activities.
- Will include at least a Bachelors Degree with an MBA desirable.

Salary to $30,000.

REPLY IN CONFIDENCE TO:
PRESIDENT
CHAIN STORE SYSTEMS, INC.
P.O. BOX 1048
BURLINGTON, IOWA 52601

computer career people

BUSINESS ANALYST/PROGRAMMER

To participate in the design, programming, testing and documentation of timeshared and batch administrative turnkey applications for the world leader in minicomputers. We require a bachelors degree or equivalent in experience, plus 1-3 years data base design and background in telecommunications, terminals, and COBOL/RPG/BASIC programming languages. PDP/11 RSTS and DOS operating systems not necessary, but very helpful. You will be responsible for hands-on data conversion and other implementation tasks using the PDP/11 minicomputers in Digital regional offices throughout the world, interfacing with field management in problem definition, systems analysis, and documentation of business requirements.

SENIOR PROJECT LEADER

of Systems/Programming

To lead in-house business analyst/programmers and the data prep function for the leading manufacturer of minicomputers. We require a bachelor's degree and 1-3 years project leadership in data base design, time-sharing, and batch processing, using COBOL or an equivalent business programming language. You will be responsible for EDP project definition, scheduling and control; the technical support of software systems design, programming, testing and documentation and the coordination of in-house management information which involves problem definition, systems analysis, documentation, and economic justification. You will use our large-scale DEC System 10 computer for both timeshared and batch applications.

Call (collect) Mr. Jim Howard
Professional Personnel at
(617) 897-5111, Extension 2721
or send resume to him at
Digital Equipment Corporation
162 Main St.
Maynard, Mass. 01754

The above positions are open for application to men and women regardless of race, national origin, age, religion or creed.

digital
digital equipment corporation

POSITION ANNOUNCEMENTS

OS Systems Programmer

Sunny Florida, 4-day week, choice of hours. Experienced professional desired to SYSGEN and modify new OS-MFT and HASP releases without assistance. BTAM and Assembler Language skills are required.

Beginning salary $12,500 (not negotiable). 5% differential added for evening shift.

call or send resume to:

David Griffith
Director of Data Processing
School Board
of Brevard County, Fla.
3205 S. Washington Ave.
Titusville, Fla. 32780
Tel: (305) 267-3311, Ext. 255

SYSTEMS PROGRAMMER ANALYST

Position open in progressive bank. Should have 3 or more years programming experience in NCR 315 NEAT and NCR Century NEAT/3. Bank implementing NCR's CENTRAL INFORMATION FILE. Salary — open. Banking background preferred. Mail resumes to:

Mrs. Joy K. Braggs
Northwest Bank & Trust Co.
1454 West Locust Street
Davenport, Iowa 52804

OPERATIONS MANAGER or ASSISTANT OPERATIONS MGR.

ready to be groomed to move up.

Progressive, well established 360/30 commercial service bureau in Houston needs working supervisor with initiative. Our staff knows of this ad.

CW Box 3858
60 Austin Street
Newton, Mass. 02160

Buy Sell Swap

Current Inventory SALE

All this Unit Record Equipment in stock and ready to ship at money saving sale or lease prices.

RARELY OFFERED 046, 029, 059, 407, A3, 548, 557, 087, 088
OTHER FINE MODELS 024, 026, 056, 077, 085, 402, 403, 407, 514, 519, 523, 552, 602, 604, 521, 826

D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
(212) 925-7737 Ext. 1

FOR SALE

TELEDYNE INET SOLID STATE UNINTERRUPTABLE POWER SYSTEM 62.5 KVA 240 VAC, 3 phase with lead calcium battery (120 C&D KCU-9 cells) for 30 minutes support of UPS. New March '71, cost $60,000. Available Oct. '73.

Mgr., Computer Systems
Transcon Lines
1206 S. Maple Ave.
L.A., Ca. 90015
(213) 749-1525

MAGNETIC TAPE

1600 BPI	800 BPI recertified	uncertified
2400	$6.00	$3.50
1200	5.00	3.00
seals	thinline	thickline
IBM	Memorex	Scotch

released from
GEOPHYSICAL Archives
not work tapes
(713) 772-5557
C.A.R.D.
7575 Bellaire Blvd.
Houston, Texas 77036

BUY SELL SWAP

AVAILABLE IMMEDIATELY IBM 1440 Three Disk System

CMI Corporation
16225 East Warren
Detroit, Michigan 48224
(313) 889-0440

WANTED New/Surplus Usable Scrap IBM Keypunch Parts Pay Top $

P.O. Box 561
Yonkers, N.Y. 10701
(914) 664-8200

HONEYWELL 120 FOR SALE

16K Central Processor
Four 26K Tape Drives
Card Reader-Punch
Printer (450 LPM)
Under Honeywell Maintenance
Available Immediately
Lease or Purchase
Call — (609) 896-9333
Original Purchase Price
$203,000.00
Selling Price
$75,000.00

FOR SALE 16K EXPANDED NOVA

5 MEG Byte Iomec Disk
Disk Controller/Interface
30 CPS KSR Syner-Data Printer
33ASR Teletype
Rack Mounted
Software + Manuals
$12,000.00
SISTEMAS ANALITICOS S.A.
(617) 890-3489
Ask for Mr. Parker

AVAILABLE FOR SALE OR LEASE

IBM 729 Magnetic Tape Units, Models II, IV, V and VI

THE HALSEY CORPORATION
1367 Central Avenue
Middletown, Ohio 45042
(513) 424-1697

FORSYTHE McARTHUR ASSOCIATES, INC

PROFESSIONAL IBM COMPUTER DEALERS 360/370

BUY-SELL-LEASE
Call or Write
919 North Michigan Avenue
Chicago, Ill. 60611
(312) 943-3770

FOR SALE OR LEASE

024-$350; 026-$1300; 056-$250; 077-$550; 082-$1,000; 083-$2900; 085-$1800; 088-$5200; 402-$1300; 403-$1500; 407-$3500; 514-$1300; 519-$1600; 548-$2300; 552-$1500; 557-$3700; 602-$400; 2311 (1) $5000; 729 (5) $2500; 729 (6) $3000; 1448 (1) $1000; 1401 systems $17,500 & $35,000.

THOMAS COMPUTER CORP.
625 N. Michigan-Suite 500
Chicago, Ill. 60611
(312) 944-1401

1400-360
Specialists
in
1401, 1440
360/20, 360/30

Hundreds
of Satisfied
Users

Free
Appraisal
Service

BUY-TRADE
SELL-LEASE

Call us last-
but
Call Us!

CMI
Area Code 313-
889-0440
16225 E. Warren
Avenue
Detroit, Mich.
48224

AVAILABLE
FOR SALE OR LEASE

SYSTEMS AND COMPONENTS:
IBM 1401 4K to 16K Card, Tape and Disk, IBM 7040 and 7070 Systems; IBM 1460 Components

THE HALSEY CORPORATION
1367 Central Avenue
Middletown, Ohio 45042
(513) 424-1697

WE
BUY • SELL
LEASE • RECONDITION
TELETYPE®

Machines — New, Used
Basket Cases
• Models 28, 32, 33, 35, 38
• BRPE's • CRT's • Couplers
• Enclosures• Modems

NAT'L TELETYPEWRITER CORP.
23 Cain Dr., Plainview, N.Y. 11803
(516) 293-0444

Honeywell
H-200 20 K System
for sale

201	Central Processor
202-1	Additional Memory
202-2	Additional Memory (4)
011	Advanced Programming
013	Edit Instructions
203B-1	Tape Control Unit
203B-3	Magnetic Tape Unit
203B-4	Magnetic Tape Units (4)
208-2	Card Punch Control
222-4	Printer (950 L.P.M.)
223	Card Reader and Control
214-2	Card Reader/Punch
032	Ext to Print Positions
043	51 Column Reading
066	High Speed Skip

Contact the Comptroller
PETROFINA CANADA LTD.
1 place Ville Marie
Montreal Quebec
tel: (514) 866-3911
telex no. 05267593
Delivery: Last Quarter of 1973.

FOR SALE
RPC-4000

2 Computer Systems
Peripherals

Electronic Business Systems
603 Citizens Bank
Paducah, Ky. 42001

FOR SALE OR LEASE
BY OWNER
360/40
Model G or H

Call or Write
Mr. D.R. Tebo

C.I.S. Corp.
Midtown Plaza
Syracuse, N.Y.
(315) 474-5776

FOR SALE OR LEASE

IBM 1401 Systems 12K & 4K 7330 Tape Drives All Under Maintenance

BROOKS INTERNATIONAL
A.C. (817) 531-2761
2731 Ludelle St.
Fort Worth, Tex. 76105

360/40 Lease Special

Complete 360/40 system available at special price. 360/40G, 2 Channels, 2314-A1 disc, 2540, 2821-1, 2403-N1, (4) 2401-2 tapes, 2803-1 available on 5 year lease at $7000/mo. As 40H $8000/mo. Why go 370 when you can get a complete system at these prices?

IPS
Computer Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs, N.J. 07632
(201) 871-4200

WANTED
BURROUGHS
L SERIES
NCR 395, 400
42 On Line
LITTON VICTOR
SYSTEMS

Call Stuart Rubenstein
I.O.A. Data Corp.
383 Lafayette St.,N.Y. 10003
(212) 673-9300

TAPE STORAGE RACKS

Double 560 Tapes	$175.00	29M Quan.
Single 280 Tapes	$105.00	19M Quan.

CANISTERS — 2400

Thinline Canisters	$ .50	30M Quan.
Thickline Canisters	$ .25	15M Quan.
Thickline with Tape Racks	$ .35	15M Quan.

REELS — 2400

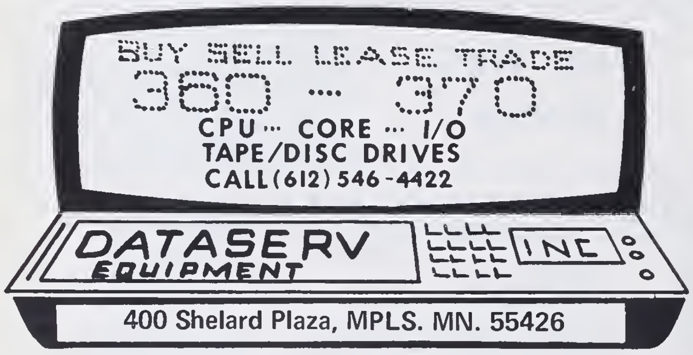
Like New — Aluminum Hubs	$ .75	15M Quan.
Good But With Labels	$ .50	6M Quan.

Call Collect
Tom Ross 713-772-5557
Computer Accessories
Research Diversified
7575 Bellaire
Houston, Texas 77036

For lease by owner
360/30
E or F

Available immediately with any features. I/O set and peripherals also available.

EDP RESOURCES INC.
One North Broadway
White Plains, N.Y. 10601
(914) 428-3804



BUY SELL LEASE TRADE
360 ··· 370
CPU ··· CORE ··· I/O
TAPE/DISC DRIVES
CALL (612) 546-4422

DATASERV EQUIPMENT INC
400 Shelard Plaza, MPLS. MN. 55426

FOR SALE BY OWNER

IBM 360/40 — 196K, serial # 23173
IBM 2314 Model 1 — 9 spindle, serial # 11382
2415 Model 1 — 2 tapes and control (9 track), serial # 10032
IBM Maintenance
Available Immediately
Sale Price $293,230

Forsythe/McArthur Associates, Inc.
919 N. Michigan Ave.
Chicago 60611
(312) 943-3770

·LEASE · BUY · SELL·

370

LEASE PLANS
3 YEARS & LONGER
LOWEST RATES

360

PRE-OWNED
EQUIPMENT

THOMAS COMPUTER CORPORATION
625 N. Michigan Ave.
Chicago, Illinois (312) 944-1401

360/25

360/25 (16K) with 1401 Compatibility, 2540, 1403-N1, 2415 available immediately for sale or lease. Excellent replacement for 1401 or 360/25 on rental.

1130

1130-2B (8K) with 1403-M7, 1442-7, 1133, with Synchronous Communications Adapter. Available May 21, 1973 for sale or lease.

IPS IPS COMPUTER MARKETING CORP.
467 Sylvan Ave., Englewood Cliffs, N.J. 07632 (201) 871-4200

2030 SYSTEM FOR LEASE

TYPE	MODEL	SERIAL NO.
2030	F	15405
1051	N1	51582
1052	6	61620
1403	N1	31988
2501	B2	20192
2520	B3	20115
2821	02	20347

Data Automation Company
4858 Cash Road
Dallas, Texas 75247
Ron Johnson (214) 637-6570

360/370 MARKETPLACE
BUY·SELL·LEASE

TLW
COMPUTER INDUSTRIES
3570 American Drive
Atlanta, Georgia 30341
404/451-1895

WE ALSO HAVE TAPE DRIVES, DISK DRIVES & OTHER PERIPHERAL EQUIPMENT.

Offices In Chicago
222 E. Wisconsin Avenue
Lake Forest, Illinois 60045
(312) 295-2030

BUY·SELL·LEASE
360/20

360
30/40/50

HOT!!
Model 25
32K w/20 Mode
Disks & Tapes
Available
30 days

370
145/155

1130

ECONOCOM

Division of Cook Industries, Inc.
2185 Democrat Road — P.O. Box 16902
Memphis, Tennessee 38116
901-396-8890 or 901-396-8600

Computer Owners Only
RECEIVE FULL PAYMENT NOW!

Commerce Group Corp. will buy your installed IBM System and lease it back to you on a monthly term basis.

You will benefit by one of the following:

1. Trade-in 360 equipment and get full benefit on 360 or 370 lease if desired;
2. Restoring flexibility to establish competitive environment;
3. Deal in used market with cash;
4. Take advantage of Commerce Group's financial strength and field engineering expertise to profit on next move.

Contact: T.E. Tilden
Senior Vice President
COMMERCE GROUP CORP.
6001 North 91st Street
Milwaukee, Wis. 53225
(414) 462-5310

Evergreen Computer and Financial, Inc.

HOME OFFICE:
Suite 120
9100 Bloomington Freeway West
Bloomington, Minnesota 55431
612/884-9751

BRANCH OFFICES:
2720 Des Plaines Avenue
Des Plaines, Illinois 60018
312/298-7890

312 East Wisconsin Ave.
Milwaukee, Wisconsin 53202
414/276-0909

FOR SALE

2030 F 1.5 (SN 16191)
1990, 3237, 4456, 4465, 4468, 5856, 4760, 6960, 7520
1051-N1
1052-8

2065 J (1 meg. byte 756K)
Fabri-tek add on (SN 60075) 7117
1052-7
2860-2
2870-1
2365-2

(2) 2365 — 2 (SN 30289, SN 30314)

2030 D 1.5 (SN 18948)
3237, 4427, 6960, 7520, 7915
1051-N1

2030 32K (SN 17426)
3237, 6960, 7915,
1051-N1
1052-8

2365 — 13 (SN 30064)

2030 16K (SN 11445)
3237, 4467, 5250, 4463, 5856
CDC 3300 System
3304-3, 3311, 3310, (8) 3302, (8) 3306, 3423, (8) 604, (1) 3234, (4) 854, 415, 3446, 405, 3447, 512-1, 595-1, 3555-1

TO BUY

2520 — B1
(2) 1442 — N1
1401 Tape and Disk System
2821-2
1311-2

IPS has a 360/40G

with (2) channels available on a month-to-month lease. Need additional capacity now? Call us for immediate shipment.

IPS

Computer Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs, N.J. 07632
(201) 871-4200

WANTED

PDP 8L or M
TRI-DATA 4196

We need several of each
We are not brokers

Donald E. Grempler
Realty, Inc.
400 E. Joppa Rd.
Towson, Md. 21204
(301) 825-6400 Ext 333

RENTALS START AT

$550/Month
IBM 1401
UNIVAC 9200
HON 200

CALL: 617/227-8634

WE BUY ANY COMPUTER
PERIPHERAL OR TELETYPE
SEND FOR FREE PRICE LIST
AMERICAN USED COMPUTER CORPORATION
15 SCHOOL ST., BOSTON, MASS. 02108

---

buy·lease·sell
370 & 360 EQUIPMENT

Branch Offices:
HARTFORD, CONN.
PITTSBURGH, PA.
WASHINGTON, D.C.

CIS PRESENTS ECONOMY IN IBM HARDWARE, and backs it up with an established reputation for service, dependability and a penchant for detail. No loose ends. Personal contact with experience gathered in the field combine to bring you maximum economy and razor sharp performance. Talk to a CIS man now. You know he'll deliver!

CIS
CONTINENTAL INFORMATION SYSTEMS CORPORATION

MIDTOWN PLAZA, SYRACUSE, NEW YORK 13210 (315) 474-5776

IBM 370's

Will purchase outright for leaseback all models IBM 370s. CSA can purchase your present 370 at book value while providing replacement systems under an attractive lease. CSA is leading independent 370 Lessor with over $50 million of equipment under lease.

CDC 3300

CDC 3300 8/K System
Full I/O Complement
Lease or Sale.
CONTACT:
R.E. Gibbs, Marketing Vice President

Computer Systems of America, Inc.

79 Milk Street, Boston, Massachusetts 02109
617-482-4671

1401's
FOR SALE OR LEASE

Low Purchase Prices
(2) 8K Systems
with 1402, 1403-2, 1406-1
1100/mo 2 yr. lease
(1) 12K System with disk adapter
and 1402, 1403-2, 1406-2
1400/mo 2 yr. lease
(1) 16K System with (4) 729-2's
and 1402, 1403-2, 1406-3
1900/mo 2 yr. lease

729-5's & 6's available

THOMAS COMPUTER CORP.
625 N. Michigan Suite 500
Chicago, Ill. 60611
(312) 944-1401

FOR SALE
(2) 2030-F - FEB.

1 & 2 Channel, With Compatibility

1403-3 – Now
1403-2 – Now
2415-II – March

SALE/LEASE/ LEASE-PURCH.
HONEYWELL
1200 - 32K TAPE-DISK SYSTEM

AVAIL – MAY 1973

ACS Equipment Corporation
8928 Spring Branch Drive
Houston, Tx 77055
(713) 461-1333

For lease by owner
360/40 G or GF

Floating point. Direct Control. Decimal Arithmetic. Two Selector channels. Storage protect. With or without I/O set and peripherals.

Available July 1973
EDP RESOURCES INC.
One North Broadway
White Plains, N.Y. 10601
(914) 428-3804

IBM 360/370
BUY...SELL...LEASE
CALL **CEI**

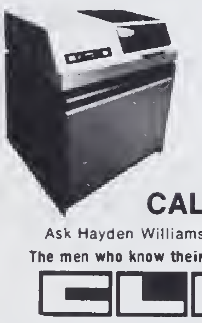
AVAILABLE:

360/30 E, F & FE (96K) CPU's (Serial Nos. 15394, 19832)
360/65 H or I Systems
2312 AI Disc, 2311's
2401 Tapes 1, 2, 3 & 5
2804-2 Controller (7 & 9 track)
360/30 IBM 32K Core E2F & F2FE (96K)
370/145, 155, 165 CPU's

CEI THE ORIGINAL COMPUTER EXCHANGE
THE COMPUTER EXCHANGE INC.
11 GRACE AVENUE
GREAT NECK, N.Y. 11021
(516) 466-6500
8105 EDGEWATER DRIVE
OAKLAND, CAL. 94621
(415) 638-9005

THE CLC CORNER

COMPUTER LEASING COMPANY OFFERS FOR SALE, RENTAL OR LEASE
2311 Disk Storage Drives
(WITH OR WITHOUT MODEL 2841 CONTROLLERS)



Low purchase prices—Buy now, or apply generous rental credits toward purchase.

Economical rental/lease plans—Terms to fit your needs, from month-to-month to five years; unlimited usage; maintenance and insurance paid by CLC.

Superior quality—Like-new condition; continued IBM maintenance guaranteed.

Fast service—2-week delivery and installation.

CALL (703) 521-2900

Ask Hayden Williams for name of sales representative nearest you.
The men who know their business get their computing equipment from . . .

CLC Computer Leasing COMPANY

2001 Jefferson Davis Highway, Arlington, Va. 22202 • Offices Nationwide
BROKERS cooperation invited.

BEFORE YOU BUY BEFORE YOU SELL GO GREYHOUND

PHONE: (602) 248-5972

WRITE: Manager of Resale Equipment
Greyhound Computer Corporation
Greyhound Tower
Phoenix, Arizona 85077

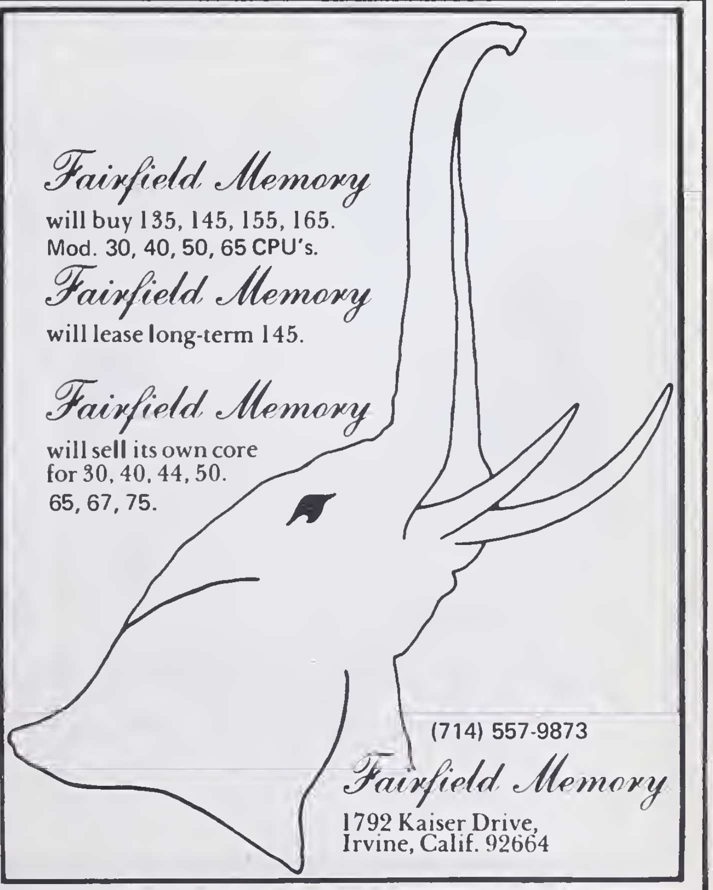
WANTED
360/65's 360/50's
360/30's 2314

FOR SALE
2040-g
feat: 3237, 4427, 6980, 6981, 7520, 7920, 1052-7
2314's

Buy·Sell Lease
360 370
3 Year Leases

The world's largest 360 equipment dealer

Call Collect or Write
Comdisco Inc.
2200 E. Devon Ave.
Des Plaines, Ill. 60018
312-297-3640



Fairfield Memory
will buy 135, 145, 155, 165.
Mod. 30, 40, 50, 65 CPU's.

Fairfield Memory
will lease long-term 145.

Fairfield Memory
will sell its own core
for 30, 40, 44, 50.
65, 67, 75.

(714) 557-9873

Fairfield Memory
1792 Kaiser Drive,
Irvine, Calif. 92664

UNIVAC 9300

16K, 4 Tapes, Punch,
Reader Printer.
For Immedate Lease
24- to 48 Months
Under Univac Maintainance
From $2,085 to $1,885
Maintainance approx, $850
Call: (214) 350-9921
Bill Shaw

---

we buy and sell

IBM Computer Systems
& Unit Record Machines
NCR 31-32-33-395-400
Burroughs - L Series

marion
84 Kennedy St.
Hackensack, N.J.
07601
(201) 343-4554

SALE/LEASE

360/20's
C1-8K, 2203 A1, 2560 A1,
C1-8K, 1403-7, 2560 A1,
BC2-12K, 1403-2, 2520 A1, 2501 A2
D2-16K, 2203 A1, 2560 A1, (2) 2311 — 2415-1

LEASE

2050 H, HG, I-CPUs

WANTED NOW

360/30 E Full System
360/30F CPU, 1051, 1052
All I/O Units
ALL MODEL 360/20's

CROSS COMPUTER CORPORATION

Specialists in placement of pre-owned computer systems. 360/370 & SYSTEM 3 lease financing available.

NEW YORK (516) 487-9812
PHILADELPHIA (215) 568-6621
505 Northern Blvd.
Great Neck, N. Y. 11021

We Need:

1419 MOD 1
2415 MOD IV
2821 MOD II

BUY
SELL
LEASE

Available:

360/40-64K
360/40-128K
360/40-196K
2401 MOD V (3)
2803 MOD II

FOR BETTER VALUE LOOK TO:

cac COMPUTER ACQUISITIONS COMPANY
P O BOX 80572, ATLANTA GA 30341 • (404) 458-4425

VERY SPECIAL 360's

In rare situations, users sometimes find that they are no longer able to profitably use their current systems. but yet cannot sell them. To answer their needs, Lunceford & Associates offers an exclusive service to place their system on lease to another user. This means that you now have the chance to lease directly from someone like yourself. Here are two unique opportunities currently being offered:

360 Model 40, 128K, 2 channel
360 Model 30, 64K, 2 channel, loaded

Your specific needs can be tailored into the terms of a lease between you and the current user. Call us now for more information.

LUNCEFORD & ASSOCIATES, INC.
7500 W. 95th Street
Overland Park, Kansas 60212
(913) 381-7272

WANTED

ALL 360 SYSTEMS

360/30
1401
1440
2311
360/25
360/20
360/40

CORPORATE COMPUTERS, INC.
420 Lexington Avenue, New York, N.Y. 10017 (212) 532-1200

America's Largest Independent Lessor of System 360

dpf

BUY
SELL
LEASE PRE-OWNED
IBM 360/370

DPF INCORPORATED
141 Central Park Ave. So., Hartsdale, N.Y.
CALL NORMAN USHER
914-428-5000

WE WANT TO BUY:

Teletype Model's
28 • 33 • 35
Modems — Couplers — Other Data Communication Equipment
WE ALSO SELL THE ABOVE
Call or Write:
DATA COMMUNICATION
EQUIPMENT BROKERS, INC.
1900 Thunderbird Street
Troy, Michigan 48084
(313) 689-2640

FOR SALE

Two 128K Units Of

IBM CORE

for 360 model 40
Call or Write
Programming Manager
P.O. Box 44
Wall Street Station
New York, N.Y. 10005
(212) 944-4900 Ext. 644

360/370 Buy-Sell-Lease

Call or Write:
George S. McLaughlin
Associates, Inc.
785 Springfield Ave.
Summit, New Jersey 07901
(201) 273-5464

For Sale by Owner
NCR Century 100
32K System

Low usage — new in Feb. 1970
Includes all disks, tape & manuals
Continuous NCR maintenance
Call or Write:
Mr. D.F. Benn
St. Louis Board
Of Education
911 Locust St.
St. Louis, Mo. 63101
314/231-3720

FOR SALE

G.E. 225 SYSTEM

16,382 Word Core
8 Tape Drives
1100 LPM Printer
Card Reader
Card Punch
Available Immediately
Finserv Computer Corp.
1462 Erie Boulevard
Schenectady, New York 12305
(518) 374-4430

For Sale Used Varian

620/i CPU's, TTY's, Mag Tape, ADC's, Core Memory, I/O Cards. Immediate Delivery. Call or write:

Sedillo Leasing
125 E. Sunnyoaks Ave.
Campbell, Calif. 95008
(408) 374-5220

TAPE SALE

OVER 75% OFF

(1) IBM 2404-2
(2) IBM 2402-2 two drive units with simultaneous read write
729-2's
729-5's
729-6's

THOMAS COMPUTER CORP.
625 N. Michigan Ave. Suite 500
Chicago, Ill. 60611
(312) 944-1401

UNIVAC 1004/1005

- Buy/Sell/Lease
- Refurbish/Overhaul/Maintain
- System Upgrades
- 90 to 80 Col. Conversions
- 80/90 Col. Parts Available

Contact M.A. Jarrett

MAINTECH INC.

1133 Ave. of the Americas
New York, N.Y. 10036
(212) 586-2823

FOR SALE

Half Price
Immediate Delivery
SERIAL PRINTER

* non-impact-quiet
* 120 cps
* 64 character-ASCII
* power supply
* standard interfacing
* I.C. circuitry
* limited supply

$600.00 each

Call (305) 859-1410
5870 S. Tampa Ave.
Orlando, Fla. 32809

FOR SALE
IMMEDIATELY AVAILABLE
360/40
G, GF, or H
CALL COLLECT OR WRITE—T. H. MADDOX
Comdisco Inc.
2200 DEVON · DES PLAINES
ILLINOIS 60018
312-297-3640

FOR SALE NCR Century Series 100

Available —
Mid Summer
CW Box 3847
60 Austin Street
Newton, Mass. 02160

FOR SALE
OR LEASE
IBM 1401
4K to 16K Systems
with or without
Tape Drives & Disks
Savings in thousands.

D.P. Equipment
Marketing Corp.
260 W. Broadway, N.Y. N.Y.
CALL (212) 925-7737 Ext. 1

DAS

FOR SALE OR LEASE
360/20/30/40 CPU's
& Systems 1401, 1440,
1620, 2311, 2841,
Univac 9200 System
All Types Unit Record

LEASE OR LEASE PURCHASE
Two 1401-16K with 729's
One 1401-12K with 729's

CALL or WRITE
Data Automation
Services, Inc.
4858 Cash Road
Dallas, Texas 75247
(800) 527-6148

318 W. 28th Street
Los Angeles, Calif. 90007
(213) 747-0587

7750 N.W. 7th Avenue
Miami, Fla. 33150
(305) 693-3911

FOR SALE

1132 PRINTER
$4,000
Serial #11667

WANTED: 360/40G

tbi®
TBI Equipment Div.
Time Brokers, Inc.
500 Executive Blvd.
Elmsford, N.Y. 10523
(914) 592-4065
Nationwide broker/dealers of DP equipment & computer time
Atlanta Baltimore Boston Chicago Elmsford N Y Los Angeles New York City Philadelphia and Washington D C

Time for Sale

MASSACHUSETTS

360/40 128K COMPUTER TIME

Modern RTE 128 computer complex offers time on their 2 Model 40 computers at an attractive rate which is commensurate with your needs.

Operators, professional software assistance, & the use of ancillary equipment is included in your per hour rate.

For Further Information Call
Richie Calogero X311
(617) 325-9600

NEW MEXICO

"KEY PUNCH"
SERVICES

Fast, accurate and economical data entry services. Will deliver on 9 channel 800 BPI tapes. Send sample source document and volume and turnaround time requirements for quotation. CompuSys Inc. P.O. Box 11104, Albuquerque NM 87112. (505) 266-7977.

NEW JERSEY

S/360/50/40/30

1287
2671 Paper Tape
Reader
ALL SHIFTS
Call: Roy Einreinhofer
Popular Services, Inc.
(201) 471-2577

CONNECTICUT

COMPUTERISTICS
SUBSIDIARY OF
UNIROYAL
COMPUTER PROCESSING
SERVICES
360/65 • 1256K • OS
HASP RJE
360/50 360/40 360/30
BATCH PROCESS
Call Collect:
George Errico (203) 573-3000
Cal Gould (203) 573-2587

TIME FOR SALE

NEW YORK

NEED A SHIFT ?
OR SOME SMALL SHOTS
MIDTOWN LOCATION
360/20/40/50
PARTITION OR DEDICATED
DOS;OS/MFT, HASP
COMPETITIVE RATES
EXCELLENT ENVIRONMENT
CONTACT
DAN MARIANI (212)551-8081
CONTINENTAL CAN CO. INC.

MICHIGAN

360-30
96K 3-2314 6-120KB
1401 COMPATIBILITY

Off-Line or On-Line Printing With 2-1200 Line-Per-Minute Chain Printers Bursting, Decollating, Mailing, Etc.

Conveniently Located Near Expressways In Dearborn, Mich.
Call (313) 354-2334

3 P.M. INC.

DATA CONVERSION
IS OUR SPECIALTY

Over 400 Data Conversion Operators Utilizing Key-Disc, Key-Tape and Key-Punch.

Southfield, Mich.
(313) 354-2334
Grand Blanc, Mich
(313) 694-5810
Dearborn, Mich.
(313) 336-9120
Cleveland, Ohio
(216) 523-1112
Toronto, Ontario, Canada
(416) 750-4896

ILLINOIS

360/65
OS-MVT-HASP
We will give flat price contracts
on jobs regardless
of how much running time is involved

HF/II
ICES
PICS
MPS
APT
BLISS
PAYROLL
PLAN
BMD
MPSX
CROSSTABS
SSP
SAS

PROJECT II
ACCOUNTS PAYABLE
ACCOUNTS RECEIVABLE
GENERAL LEDGER
General Purpose Simulation System
Continuous System Modeling Program
Urban Transportation Planning System 360
Block Time and Remote Batch
Your Programs or Ours

Stat-Com
A Division of Statistical Tabulating Corp
(312) 346-7300
Vern Brownworth

TIME FOR SALE

ILLINOIS

NEED TIME
360/65 DOS 512 K
with 7080 Emulator
12 Tape Drives
16 2314 Disk Drives
On and Off
Line Printers
Interested in Selling Block Time
Five or Seven Days a Week
Located in Chicago Central
Business District
Excellent Physical Facilities
Will Provide Office & Storage
Call (312) 225-6800, Mr. Zimmer

COMPUTER TIME
AND SERVICES

$14.50 per hour for computer time on 360-20 with 16K and 2 - 2311 Disks. Systems design and RPG programming for accounting, inventory control, production management, and sales analysis at equally low rates.

Hysan Corp.
919 W. 38th St.
Chicago, Illinois 60609
(312) 376-8900 X14

IBM 360/370 USERS:
The Cost of Computer Time Just Went Down
Going through a Conversion?
LET GOLDEN FIFTY
MAKE IT EASIER FOR YOU,
AND SAVE YOU TIME
AND DOLLARS!

360/50 256K 2314 (9 spindles).
7-3420-M7 (9 TRK 800/1600 BPI)
1-3420-3. (7 TRK 800 BPI) 2-1403N2
360/50 512K 2314 (9 spindles)
8-2401-M6 (9 TRK 800/1600 BPI)
2-140361
OFFLINE PRINTER CPU TELETYPE
TAPE CONTROL UNIT (1600 BPI) 1403N1

360/50 512 or 256K Rates

	8 A.M.-8 P.M.	8 P.M.-8 A.M.
Weekdays	$65/Hour	$55/Hour
Weekends	$45/Hour	$45/Hour

OFFLINE PRINTER RATES
7 DAYS A WEEK—ALL HOURS $20/HOUR

ENJOY THE PRIVACY OF MODERN OFFICES SUPPLIED FOR DEBUGGING PROGRAMS. AND RESEARCH
Ample Storage Space Provided
CALL: Hank Starkey
or Dan Grey
Golden fifty
312/583-5410 or 5411
COMPUTER SERVICE DIVISION
5320 N Kedzie Ave. • Chicago, Ill. 60625

IBM 360/370 USERS
Computer Time Available

370/155 2.0 MEG, 8 3330's, 2 2314's, 10 3420 Tapes,
RJE, BATCH, TSO

24 Hours—7Days
CAN YOU BEAT
7.2¢/sec for a 60K region?

360/65 1.5 MEG, 4 3330's
2 2314's
10 3420 Tapes

	8am—8pm	8pm—8am
Weekdays	Not Avail	$95/hr.
Weekends	$60/hr.	$50/hr.
12 hr. block weekend	$50/hr.	$40/hr.

370/135 144k, 1 2314, 4 2311,
6 3420-5 Tapes

	8am—8pm	8pm—8am
Weekdays	$85/hr.	$55/hr.
Weekends	$40/hr	$35/hr.
12 hr. block weekend	$35/hr.	$30/hr.

370/135 240K, 4 3330's,
1 2314, 6 2401-6 Tapes
Rates same as 370/135 above.

360/30 64K, 6 2401 Tapes,
5 2311's

	8am—8pm	8pm—8am
Weekdays	$50/hr.	$40/hr.
Weekends	$33/hr	$27/hr.

FOR FURTHER INFORMATION CALL PAUL SARRIS or RON ELLIS (312) 346-1331

computer research company
200 N. Michigan Ave.
Chicago, Ill. 60601
Largest Computer
Time Sales Company

TIME FOR SALE

ILLINOIS

360/30
128K
Large blocks
all shifts availability
5-2314's
4-2401's 9 track
1-2401 7 track
1403 N1 Printer
2540 Reader Punch
1400 Compatibility
CALL
Ray Bruns
(312) 279-3070
Digicom, Inc.
683 Larch
Elmhurst, Ill. 60126

Software Wanted

Immediate Requirement

for Comprehensive Billing and Accounting Systems for:
Equipment Leasing Operation
and
Cable Television Operation
For Processing on 370/145 DOS
CW Box 3857
60 Austin St.
Newton, Mass. 02160

Software for Sale

CATS I/R
INVENTORY RECORDKEEPING

Features include:
*extensive history data
*many user and report options
*good audit trails and mgnt. controls
*designed for efficient processing

Under control of the CATS MASTER Systems Controller, provided FREE with the license of any of the CATS programs. Also available are: Accounts Payable-Cash Requirements, Accounts Receivable — Open Item, and Accounts Receivable — Retail System.

For information contact:
Tom Leopard, President
COMPUTER WARES, INC.
P O Box 31205, Birmingham
Ala 35222 - Phone 205/595-0511

OBSOLETE REPORTS?

Every D.P. Department generates them!
. . . at a substantial cost

RECOOP
Discovers them!
. . . at very little cost

RECOOP is the most effective automated management tool available for analysis, audit, evaluation, and control of E.D.P. Report generation.

International Management Systems
Corporation
9665 Wilshire Blvd.
Beverly Hills, Calif.
(213) 278-8027

OTHER SERVICES: Business Application Packages • Contract Programming • Consulting

SOFTWARE FOR SALE

PAYROLL/
PERSONNEL
ACCOUNTS PAYABLE
TAXBREAK
Payroll Tax Calculation Module

ARGONAUT INFORMATION
SYSTEMS, INC.
POST OFFICE BOX 112.
WALNUT CREEK, CA.
94596 (415) 937-4675

AUTOCODER & SPS TRANSLATED AUTOMATICALLY to BAL & PL/1
THE TOTALTRAN SYSTEM

. . . The most economical, practical and quickest method of converting to the 3rd and 4th generation.

3 SERVICES OFFERED:
1. 1400 Object to clean source decompilation
2. 1400 Clean source to BAL translation
3. 1400 Clean source to PL/1 translation

Contact: W. Small, President

CPU MANAGEMENT
ADVISORY CORP.
853 Broadway, N.Y. 10003
(212) 777-7722

Is $960 Too Cheap?
How About $62/Month?

That's all we charge for our SUPER/PAY Payroll System. A very comprehensive system ordered by over 30 top firms in the past year, who liked SUPER/PAY's features as well as price.

-All COBOL — 48K or above
-Variable or fixed input
-Disk or tape-IBM or others
-State and local taxes
-DOS or OS
-Unlimited deduction & earnings
-Vacation and sick leave acctg.
-Skill & education profile
-Outstanding documentation
-30 day free trial

Try the system as others have and we know you will like it. Ask about our General Ledger Accounts Payable & Receivable available on the same plan.

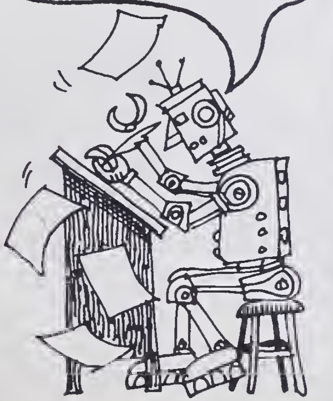
Call or Write Today
Datalease Corporation
6430 Sunset Blvd.
Los Angeles, Calif. 90028
(213) 461-4888

ACCOUNTING SYSTEMS

- Accounts Receivable
- Accounts Payable
- General Ledger
- Fixed Asset
- Sales Analysis
- Report Writer

More than 80 companies are successfully and profitably using these valuable management tools. For immediate information, call collect to the office nearest you.

INFONATIONAL
Chicago 312/986-1346
Dallas/Ft. Worth 817/732-6603
Los Angeles 213/383-4191
Miami 305/666-1931
New York 212/489-1660
San Diego 714/238-6344
1119 Sixth Avenue
San Diego, Ca. 92101



SOFTWARE FOR SALE

SYSX
LOOKING FOR SOFTWARE?

Free Software Search and Package Appraisal Service

Our job is to help you locate the software packages which best meet your needs. There is no charge to you for this service. Write on your company letterhead or call:

Systems Exchange Co.
1034 Colorado Ave.
Palo Alto, Calif. 94303
(415) 328-5490
SYSX

asystance
THE FINEST GENERAL LEDGER AND FINANCIAL REPORTING SYSTEM AVAILABLE

Featuring:
- Conventional Report Generator
- Graphic Report Generator
- Matrix Report Generator
- Responsibility Reporting
- Flexible Budgeting Module
- Multiple Currency Version to accommodate foreign subsidiary accounting

asystance
2610 Wycliff Road
Raleigh, North Carolina 27607
(919) 782-7300
New York: (212) 586-5977

MMS GENERAL LEDGER
is hard at work for over 65 of the biggest US corporations* TO FIND OUT WHAT THEY KNOW THAT YOU DON'T, CALL:

New York	212-972-9540
Chicago	(312) 729-7410
Atlanta	404-255-0039
Los Angeles	(213) 437-3301

Software
International
Corporation
2 Elm Square
Andover, Mass. 01810
(617) 475-5040

*so are Accounts Receivable, Accounts Payable, Inventory Management packages.

Nickels & Dimes

Pitney Bowes' first quarter earnings, which rose 15% from last year, were reduced by $1.3 million in the first quarter by its equity in losses and amortization charges of **Pitney Bowes-Alpex**, and by $652,000 by the losses of its European retail systems operations.

Pitney Bowes expects Pitney Bowes-Alpex to "continue to have losses at least through the balance of the year," President Fred T. Allen said.

$$$

Wavetek is optimistic about the future of its data communications operations, but expects profitability in the area of data communications operations is "at least six months away," President John M. Thornton said.

$$$

The management of **NN Corp.** is paying particular attention to the operations of its **Executive Computer Systems** subsidiary, where revenues "have not materialized as rapidly as anticipated," the firm said.

$$$

The board of directors of **Graham Magnetics** has authorized the company to purchase up to 50,000 shares of its outstanding common stock on the open market to be held as treasury stock.

$$$

National Information Services saw "major improvement in its minicomputer system business in 1972, especially in the area of management information systems designed for small- to medium-size business, President Gilbert D. Beinhocker said.

$$$

Rapidata increased its annual dividend to 5 cents a share from 3 cents a share last year. The dividend is payable May 21 to shareholders of record May 7.

$$$

Correction

Applied Data Research had its second consecutive quarter in which software product sales exceeded $1 million. Earnings for the period totaled $56,287 compared with $13,590 in the year-ago period, while revenues reached a record $2.4 million from $2.1 million a year ago.

THE
AMERICAN
COMPUTER
EXCHANGE
INC.

ANNOUNCES A NEW
CONCEPT IN
COMPUTER MARKETING

An EDP EQUIPMENT EXCHANGE

on which your company lists its equipment. **Buy-Sell-Lease Sub-Lease or Finance**

Benefits? One outlet for:

- National and International Mailings
- Broker/Dealer Mailings
- National Advertising
- Assistance in Sale/Purchase
- Transportation and Installation Arranged
- Assistance in Lease/ Finance Packages

Payment for equipment goes **directly from Buyer to Seller!!!!!**

Cost? No charge for subscription or "Buy" listings.
$25 for "Sell" listings

5% Servich Charge paid by Seller

Information?
Call ACX at (216) 464-3881
or write to: ACX
24500 Chagrin Blvd.
Beachwood, Ohio 44122

UCC First Quarter Earnings Decline

DALLAS – University Computing Co.'s first quarter earnings figures reflect negligible realized capital gains from insurance operations in the period ended March 31.

Earnings for the period totaled $2.1 million or 26 cents a share compared with $11.8 million or $1.34 a share in the year-ago period. Capital gains from insurance operations accounted for $10.6 million of earnings in the 1972 period.

Consolidated revenue totaled $25.8 million compared with a restated $26.2 million in the same 1972 quarter. Operating results were restated to set forth separately results of the sold communications manufacturing and life insurance subsidiaries as discontinued operations, the firm said.

Income From Units

Results from the units before taxes, corporate overhead and financial costs were $1.3 million on revenue of $20.9 million from computing operations, University Computing Utility Co.; and underwriting income of $1.9 million and investment income of $1.8 million from the Gulf Insurance Company.

No earnings were reported from the Computer Leasing Co. which had $4.9 million in revenue, as depreciation of equipment is calculated to equal revenue, less selling, administrative and financial costs.

During the quarter, UCC increased by $3.5 million to $21.7 million its investment in Data Transmission Co., the firm said.

Overseas Sales and Rental Revenue Help Boost Inforex 1st Period Net

BURLINGTON, Mass. – Increased sales to its overseas distributors and higher rental and service revenues were cited as helping Inforex, Inc. report first quarter earnings of $813,000 or 29 cents a share compared with a loss of $194,000 or 8 cents a share in the 1972 period ended March 30.

The key-to-disk maker's revenues totaled $7.8 million compared with $4.3 million in the year-ago period.

Rental and service revenues of $3.4 million for the quarter represent an increase of 19% over the fourth quarter of 1972, and were more than twice the $1.6 million reported for the first quarter of last year, the firm said.

The three-fold gain in other sales as reported a year ago largely reflects increased sales to the firm's overseas distributor network, an Inforex spokesman said.

Keystation shipments during the quarter totaled 2,046. At the end of March, the company said its installed base was 13,893 keystations, with 826 customers. Inforex said 97 new customers were added during the quarter.

The backlog at the end of March was $9 million compared with $11.7 million at year-end, although the keystations were at the same level, according to President T.B. Horgan.

The if sold value of the.backlog declined, he said, because of heavy first quarter installations of extra-charge features plus a reduction in the selling price of Inforex equipment in Europe.

Pertec 3d Period Up, 9 Months Drop

LOS ANGELES – Pertec Corp.'s third quarter earnings and revenues were up from those of the same period a year ago, but nine month earnings sagged.

Earnings in the quarter reached $435,000 or 14 cents a share compared with $379,000 or 12 cents a share for the year-ago period.

Revenues rose to $7.5 million compared with $5.1 million in the same 1972 period.

The rise in revenues came from increases in all segments of business, according to President Ryal R. Poppa, who added that despite continuing high expenditures in engineering and marketing, earnings increased over the previous quarter.

In the nine months, earnings, including an $80,000 extraordinary expense associated with a proxy fight, totaled $1.1 million or 35 cents a share compared with $1.6 million or 50 cents a share in the same 1972 period.

Revenues rose to $19.4 million from $16.8 million a year ago.

New Registrations

WALL STREET COMPUTER CORP., 1212 Ave. of the Americas, New York, N.Y., a brokerage house bookkeeping service, filed to register 117,466 shares of common, issuable upon exercise of warrants issued in connection with the acquisition of the assets of Data Decision Corp.

RECOGNITION EQUIPMENT INC., 2701 East Grauwyler Road, Irving, Texas, filed to register 120,377 shares of common, in exchange for outstanding common stock of Corporation S, at the rate of one-seventh of a Recognition share for each Corporation S share.

Acquisitions

Bunker Ramo has acquired the **Electronic Store Information Systems Division** of **Nuclear Data, Inc.** for $3.2 million in cash.

Negotiations have been terminated regarding the acquisition of **First National Indemnity Co.** of Cisco, Texas, by **Itel Corp.**

Airpax Electronics Inc. has reached an agreement in principle to acquire all outstanding stock of **American Data Corp.** of Huntsville, Ala.

Western Union Corp. has agreed in principle to acquire **National Sharedata Corp.** in a stock swap valued at $23.5 million.

Computer Identics Corp. has acquired **ACI Systems Corp.** from Intermodal Transportation Systems, Inc. for an undisclosed sum of cash and shares of Computer Identics' common stock.

The acquisition of **Western Dynex Corp.** by **Microdata Corp.** has been terminated by mutual agreement.

Fabri-Tek Inc. has agreed to acquire **Digiac Corp.** of Long Island, N.Y. Digiac produces computer educational training systems.

Sedgwick Printout Systems Corp. of Princeton, N.J., has acquired **American Computergraphics Corp.** for an undisclosed amount of cash.

Transnet Corp. has absorbed **Sigmatron, Inc.**, a California corporation, into **Sigmatron, Inc.**, a wholly owned Delaware subsidiary of Transnet for 613,274 shares of its common stock.

C

THE
Sidewinder™

$49.95

The Sidewinder is a sleek, electrically driven, heavy duty paper tape winder for any computer installation, big or small. It holds 800 feet of paper tape and features rugged reliability at low cost.

ORDER NOW OR
SEND FOR MORE INFORMATION

Peripheral Graphics, Inc.
Andover Industrial Ctr/York St
Andover, Mass 01810 (617)-475-9055

Increase your
Throughput
with CIMS
(Computer Installation Management System)

The big move is to OS—and Boothe is there with a product that guarantees increased performance.

It's our Computer Installation Management System (CIMS), a proven method for providing management with pertinent information in the utilization of data processing hardware. The system is established and in use at a number of S/360 and S/370 installations.

CIMS accepts data collected by the Systems Management Facility (SMF), formats the data, and presents the data in varying sequences for user analysis.

These varying sequences and summary levels of presentation allow rapid and complete reporting flexibility. Simple control card manipulation provides custom tailored reports, economically—permits up to ten distinct reports during one processing pass of the data file(s). Reports for Job Accounting, Multiprogramming Efficiency, Throughput Analysis, Hardware Utilization and many more are provided. Report program is automatically filed for future use.

Set-up time is only five minutes for the installation of this truly comprehensive Computer Installation Management System.

BOOTHE
MANAGEMENT SYSTEMS

San Francisco • 555 California St.
CA 94104 • 415/989-6580
New York • c/o Transnational Computer Corp.
135 W. 50th St. • NY 10020 • 212/489-8710

Call today or use this form

30-DAY FREE TRIAL
☐ Please send me the CIMS Product for my 30-day trial.
☐ Please send additional information.
Name__________
Title__________
Company__________
Address__________
____
Telephone__________

TRADE★QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC Cambridge, Mass 02139

CLOSING PRICES THURSDAY, MAY 17, 1973

SOFTWARE & EDP SERVICES

EXCH		1973 RANGE (1)	CLOSE MAY 17 1973	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 1/4	0	0.0
A	APPLIED DATA RES.	2- 4	2 1/8	- 5/8	-22.7
O	APPLIED LOGIC	2- 3	1 1/2	- 1/8	-7.6
N	AUTOMATIC DATA PROC	65- 94	68 1/4	-5 1/2	-7.4
O	BRANDON APPLIED SYST	1- 1	5/8	0	0.0
O	COMPUTER DIMENSIONS	2- 5	4	- 1/4	-5.8
O	COMPUTER DYNAMICS	1- 2	5/8	0	0.0
O	COMPUTER NETWORK	2- 5	1 1/2	0	0.0
N	COMPUTER SCIENCES	2- 6	2 5/8	- 1/2	-16.0
O	COMPUTER TASK GROUP	1- 2	1 1/2	+ 1/8	-9.0
O	COMPUTER TECHNOLOGY	2- 3	1 1/2	- 1/4	-14.2
O	COMPUTER USAGE	5- 9	5 1/4	- 1/2	-8.6
O	COMRESS	1- 2	1/4	0	0.0
O	COMSHARE	5- 9	5 1/4	- 1/8	-2.3
N	CORDURA CORP	6- 15	6 7/8	- 7/8	-11.2
O	DATATAB	3- 4	2 1/4	0	0.0
O	EDP RESOURCES	1- 3	1	- 1/8	-11.1
A	ELECT COMP PROG	1- 2	1 1/8	- 1/8	-10.0
N	ELECTRONIC DATA SYS.	35- 56	37 1/2	-1 5/8	-4.1
O	INFORMATICS	2- 6	3 1/2	+ 3/4	+27.2
O	I.O.A. DATA CORP	1- 1	3/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3	0	0.0
O	KEYDATA CORP	7- 12	6 3/8	- 3/8	-5.5
O	LOGICON	4- 7	4 1/8	- 1/8	-2.9
A	MANAGEMENT DATA	2- 5	2	0	0.0
O	NATIONAL CSS INC	8- 41	24	-1	-4.0
O	NATIONAL INFO SRVCS	1- 2	1 1/8	0	0.0
P	ON LINE SYSTEMS INC	13- 17	13	-1 3/4	-11.8
N	PLANNING RESEARCH	3- 7	2 5/8	- 7/8	-25.0
O	PROGRAMMING METHODS	22- 24	23 1/4	0	0.0
O	PROGRAMMING & SYS	1- 1	7/8	0	0.0
O	RAPIDATA INC	13- 24	11	-1 3/4	-13.7
O	SCIENTIFIC COMPUTERS	1- 2	1	0	0.0
O	SIMPLICITY COMPUTER	2- 4	3 1/4	- 1/4	-7.1
O	TBS COMPUTER CENTERS	3- 4	2 3/4	0	0.0
O	TCC INC	1- 1	1/2	0	0.0
O	TYMSHARE INC	7- 12	7 1/8	- 1/2	-6.5
O	UNITED DATA CENTER	5- 6	4	- 1/4	-5.8
N	UNIVERSITY COMPUTING	5- 11	5	-1 1/8	-18.3
A	URS SYSTEMS	4- 8	4 1/2	- 1/4	-5.2

PERIPHERALS & SUBSYSTEMS

EXCH		1973 RANGE (1)	CLOSE MAY 17 1973	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	15- 34	15 1/8	-1	-6.2
O	ADVANCED MEMORY SYS	8- 23	9 1/2	+1 1/4	+15.1
N	AMPEX CORP	4- 7	4 1/8	- 3/8	-8.3
O	ANDERSON JACOBSON	3- 6	3 1/4	-1	-23.5
O	BEEHIVE MEDICAL ELEC	6- 10	7	- 1/2	-6.6
A	BOLT,BERANEK & NEW	7- 12	7 1/8	- 7/8	-10.9
N	BUNKER-RAMO	6- 18	12 1/2	-2 1/8	-14.5
A	CALCOMP	7- 13	7 3/8	-1 5/8	-18.0
O	CAMBRIDGE MEMORIES	10- 15	11 1/4	+ 1/4	+2.2
O	CENTRONICS DATA COMP	13- 28	20	-2 1/4	-10.1
O	CODEX CORP	11- 19	11 1/2	-1 1/2	-11.5
O	COGNITRONICS	1- 3	1 7/8	- 1/8	-6.2
O	COMPUTER COMMUN.	2- 4	1 3/4	+ 1/8	+7.6
A	COMPUTER EQUIPMENT	2- 3	2 1/2	- 3/8	-13.0
O	COMPUTER MACHINERY	7- 13	7 5/8	- 5/8	-7.5
O	COMPUTER TRANSCEIVER	2- 6	1 3/4	- 1/8	-6.5
A	COMPUTEST	3- 5	4 7/8	0	0.0
N	CONRAC CORP	17- 32	17 1/4	-1 5/8	-8.6
A	DATA PRODUCTS CORP	3- 4	2 5/8	- 1/8	-4.5
O	DATA RECOGNITION	2- 3	1 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	2 5/8	0	0.0
O	DI/AN CONTROLS	2- 4	2 1/4	- 1/8	-5.2
N	ELECTRONIC M & M	3- 6	3 3/8	- 5/8	-15.6
O	FABRI-TEK	3- 5	2 3/4	- 1/4	-8.3
O	GENERAL COMPUTER SYS	6- 9	5 3/4	0	0.0
N	GENERAL ELECTRIC	58- 76	57 3/4	-3 1/4	-5.3
N	HAZELTINE CORP	7- 9	6 3/4	- 3/8	-5.2
O	INFOREX INC	12- 23	11 7/8	-3 5/8	-23.3
O	INFORMATION DISPLAYS	1- 2	3/4	0	0.0
O	INFORMATION INTL INC	11- 15	10 1/2	- 1/2	-4.5
A	LUNDY ELECTRONICS	4- 9	4 1/2	- 3/8	-7.5
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MILGO ELECTRONICS	17- 28	18	-1 3/4	-8.8
N	MOHAWK DATA SCI	4- 13	4	- 7/8	-17.9
O	ODEC COMPUTER SYST.	3- 6	3	- 1/4	-7.6
O	OPTICAL SCANNING	2- 7	3 3/4	0	0.0
O	PERTEC CORP	5- 8	6 1/8	- 5/8	-9.2
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	4- 9	4 1/8	- 3/8	-8.3
O	PRECISION INST.	2- 6	3	- 1/2	-14.2
O	RECOGNITION EQUIP	4- 8	4 5/8	- 5/8	-11.9
N	SANDERS ASSOCIATES	8- 18	7 3/4	- 7/8	-10.1
O	SCAN DATA	2- 6	1 3/4	- 1/4	-12.5
O	STORAGE TECHNOLOGY	17- 34	13 3/4	-3 1/4	-19.1
O	SYCOR INC	9- 14	12	-1 1/2	-11.1
O	TALLY CORP.	2- 14	2 3/8	-1 1/8	-32.1
N	TEKTRONIX INC	34- 53	33 7/8	-2 7/8	-7.8
N	TELEX	4- 6	3 5/8	- 1/8	-3.3
O	WILTEK INC	13- 18	11 3/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1973 RANGE (1)	CLOSE MAY 17 1973	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	5- 9	6 1/2	- 1/4	-3.7
A	BARRY WRIGHT	6- 13	7 1/2	- 1/2	-6.2
A	DATA DOCUMENTS	19- 22	19 5/8	- 3/8	-1.8
O	DUPLEX PRODUCTS INC	8- 10	7 3/4	0	0.0
N	ENNIS BUS. FORMS	5- 8	5 1/4	- 1/2	-8.6
O	GRAHAM MAGNETICS	13- 20	13	- 3/4	-5.4
O	GRAPHIC CONTROLS	10- 12	9 3/4	-1	-9.3
N	3M COMPANY	78- 89	80	-3	-3.6
O	MOORE CORP LTD	55- 60	54 3/4	-3 1/8	-5.3
N	NASHUA CORP	42- 58	48 3/4	+ 1/2	+1.0
O	REYNOLDS & REYNOLD	41- 51	41	-3	-6.8
O	STANDARD REGISTER	16- 20	15 3/4	-1 1/4	-7.3
O	TAB PRODUCTS CO	14- 23	12	- 1/2	-4.0
N	UARCO	19- 23	18 1/2	- 1/4	-1.3
A	WABASH MAGNETICS	6- 7	5 7/8	+ 1/8	+2.1
N	WALLACE BUS FORMS	20- 26	19 1/2	- 3/4	-3.7

COMPUTER SYSTEMS

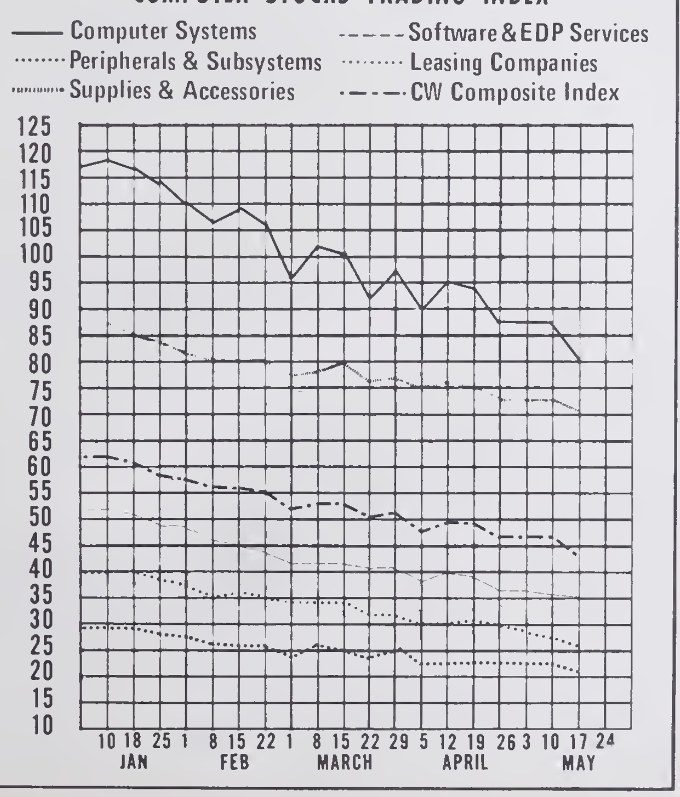
EXCH		1973 RANGE (1)	CLOSE MAY 17 1973	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	211-245	217 1/8	-5	-2.2
N	COLLINS RADIO	18- 26	19 3/8	- 7/8	-4.3
N	CONTROL DATA CORP	42- 62	42 1/2	-3 1/8	-6.8
O	DATA GENERAL CORP	32-131	37	-3 1/4	-8.0
O	DIGITAL COMP CONTROL	3- 6	3 1/8	+ 1/8	+4.1
N	DIGITAL EQUIPMENT	73-105	80	-6 3/8	-7.3
N	ELECTRONIC ASSOC.	4- 9	4 1/4	- 7/8	-17.0
A	ELECTRONIC ENGINEER.	7- 11	6 1/2	-1 1/8	-14.7
N	FOXBORO	24- 32	24 1/2	-1 1/8	-4.3
O	GENERAL AUTOMATION	26- 55	28 1/2	-7 1/2	-20.8
O	GRI COMPUTER CORP	1- 3	1 1/8	- 1/8	-10.0
N	HEWLETT-PACKARD CO	74- 95	75 1/2	-3 5/8	-4.5
N	HONEYWELL INC	105-139	106 3/4	-2 7/8	-2.6
N	IBM	396-457	397	-13 1/2	-3.2
O	INTERDATA INC	7- 13	9 7/8	- 7/8	-8.1
N	MEMOREX	2- 19	3	-3 1/8	-51.0
O	MICRODATA CORP	6- 10	4 1/2	- 7/8	-16.2
N	NCR	27- 35	32 5/8	-1	-2.9
N	RAYTHEON CO	26- 34	27 1/8	- 7/8	-3.1
N	SPERRY RAND	38- 50	38 1/8	-2 5/8	-6.4
A	SYSTEMS ENG. LABS	3- 8	3	- 5/8	-17.2
N	VARIAN ASSOCIATES	12- 20	12 1/8	-1	-7.6
N	WANG LABS.	15- 34	15 1/4	-1 3/4	-10.2
N	XEROX CORP	141-169	141 1/4	-13 1/2	-8.7

LEASING COMPANIES

EXCH		1973 RANGE (1)	CLOSE MAY 17 1973	WEEK NET CHNGE	WEEK PCT CHNGE
A	BOOTHE COMPUTER	2- 5	1 3/4	- 1/2	-22.2
O	BRESNAHAN COMP.	1- 2	2 1/8	+ 1/8	+6.2
O	COMDISCO INC	9- 17	8 5/8	- 7/8	-9.2
O	COMMERCE GROUP CORP	4- 4	3 1/2	- 1/4	-6.6
O	COMPUTER EXCHANGE	1- 1	5/8	0	0.0
A	COMPUTER INVSTRS GRP	3- 8	2 3/4	- 3/8	-12.0
O	COMP. INSTALLATIONS	2- 2	1 1/2	- 1/8	-7.6
N	DPF INC	6- 9	6	0	0.0
M	DATRONIC RENTAL	2- 3	2 1/4	0	0.0
A	DCL INC	2- 3	2	- 1/4	-11.1
A	DEARBORN-STORM	15- 26	14 7/8	-2	-11.8
A	DPA, INC.	5- 8	5 3/8	+ 1/4	+4.8
A	GRANITE MGT	3- 6	2 7/8	- 1/8	-4.1
A	GREYHOUND COMPUTER	4- 6	3 5/8	- 1/2	-12.1
A	ITEL	5- 12	5 3/8	+ 1/8	+2.3
N	LEASCO CORP	9- 18	9 5/8	- 7/8	-8.3
O	LEASPAC CORP	2- 8	2 1/4	0	0.0
O	LECTRO MGT INC	1- 2	3/4	0	0.0
A	ROCKWOOD COMPUTER	1- 3	1 1/4	- 3/8	-23.0
O	SYSTEMS CAPITAL	7- 15	6 1/4	- 1/4	-3.8
N	U.S. LEASING	20- 36	20 1/4	-4 1/2	-18.1

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

COMPUTER STOCKS TRADING INDEX



Earnings Reports

NATIONAL DATA
Nine Months Ended Feb. 28

	1973	1972
Shr Ernd	$.29	$.16
Revenue	9,932,000	6,539,000
Earnings	1,420,000	807,000

XEROX
Three Months Ended March 31

	1973	1972
Shr Ernd	$.88	$.73
Revenue	668,700,000	549,800,000
Earnings	69,800,000	57,400,000

COMPUTER DESIGN
Year Ended Dec. 31

	1972	1971
Shr Ernd	.....	$.58
Revenue	$18,582,000	14,332,708
Earnings	(678,036)	828,313

TALLY
Year Ended Dec. 31

	1972	a1971
Revenue	$12,332,345	$9,962,142
bSpec Cred	17,500	116,658
Loss	1,441,787	1,665,785

a-Restated to reflect reclassification of a loss from discontinued operations of subsidiary. b-In 1972, tax credit; in 1971, gain on sale of assets on discontinuance of operations of subsidiary, from costs of relocating to new plant and tax credits.

IBM
Three Months Ended March 31

	1973 (000)	1972 (000)
Shr Ernd	$2.92	$2.64
Revenue	2,450,511	2,312,249
Earnings	340,132	305,708

BURROUGHS
Three Months Ended March 31

	1973	1972
Shr Ernd	$.99	$.66
Revenue	274,435,000	220,602,000
Spec Cred	a2,425,000	.....
Earnings	18,771,000	12,160,000

a-From sale of securities.

TERMINAL EQUIPMENT
Six Months Ended March 31

	1973	1972
Shr Ernd	$.17	.....
Revenue	907,709	$256,914
Earnings	112,436	(118,464)

INTERDATA
Three Months Ended March 30

	1973	1972
Shr Ernd	$.13	$.11
Revenue	3,829,600	2,841,500
Tax Cred	43,600	146,800
Earnings	272,500	210,700

HONEYWELL
Three Months Ended March 31

	1973	1972
Shr Ernd	$.89	$.60
Revenue	525,928,000	450,195,000
Tax Cred	786,000	.....
Earnings	16,905,000	11,224,000

TEXAS INSTRUMENTS
Three Months Ended March 31

	1973	1972
Shr Ernd	$1.67	$.97
Revenue	289,008,000	215,762,000
Earnings	18,864,000	10,777,000

COMPUTER AUTOMATION
Three Months Ended April 1

	1973	1972
Shr Ernd	$.16	$.12
Revenue	3,081,161	1,227,002
Tax Cred	1,000	78,000
Earnings	272,020	162,827
9 Mo Shr	.54	.26
Revenue	7,892,090	2,936,413
Tax Cred	184,000	151,000
Earnings	849,927	316,270

GRAHAM MAGNETICS
Nine Months Ended March 31

	1973	1972
Shr Ernd	$.73	a$.89
Revenue	8,263,333	6,897,093
Tax Cred	.....	190,000
Earnings	680,091	661,348

a-Adjusted to reflect a 3% stock dividend in March 1973.

APPLIED MAGNETICS
Three Months Ended March 31

	1973	1972
Shr Ernd	$.14	$.09
Revenue	11,483,000	6,268,000
Earnings	603,000	393,000
6 Mo Shr	.24	.16
Revenue	21,872,000	11,900,000
Earnings	1,028,000	676,000

CONTROL DATA
Three Months Ended March 31

	1973	1972
Shr Ernd	$1.08	$.73
Revenue	200,598,000	127,721,000
Spec Cred	274,000	510,000
Earnings	17,417,000	11,047,000

RAPIDATA
Year Ended Dec. 31

	1972	1971
Shr Ernd	$.58	a$.33
Revenue	7,684,214	5,401,463
Tax Cred	.....	74,070
Earnings	1,086,253	567,644

a-Adjusted for two-for-one stock split in June 1972.

OUR MEMORIES LET YOU ADD THE FRILLS AS YOU ADD THE CAPACITY.

Cambridge builds big add-on memories – the biggest you can find anywhere. Up to four megabytes for System/370 models 155 and 165. Up to two megabytes for System/360 model 65. Up to 262K bytes for the 360/30. But size isn't everything, so Cambridge includes *at no cost* features not found anywhere else. Like "fail-safe" operation: if part of the memory fails, the rest runs at full speed. Like storage protect: we include it as a standard feature on every large add-on system. Like simple interconnection: our technique can save you $200,000. Like compactness: our 360/370 add-ons average one-third the size of equivalent IBM units. Then there's the price: it's certain to gain your respect. At Cambridge, we look at it this way: smooth sailing for our customers, snug harbor for us.

CAMBRIDGE.

A good place to put your information.

360/CORE

Add-on and extended memory systems for Models 22, 30, 40 50 and 65 processors in the System/360 line.

370/STOR

Up to four megabytes of main memory for the Models 155 and 165 in the IBM System/370 line.

EXPANDACORE 11

Full expansion for all PDP-11 processors, with 30% speed increase in some models. Two-way data save, interleaving and other features.

EXPANDACORE 620

Up to 32K storage for all 620/i, L, L-100 minis. Self-contained and self-powered 5¼" plug-in system.

OEM MEMORIES

Core and semiconductor memories for mainframes, controllers, peripherals and terminal products.

cmi

CAMBRIDGE MEMORIES, INC., 696 Virginia Road, Concord, Mass. 01742 (617) 369-8850